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STEEL

The Magazine of Metalworking and Metalproducing

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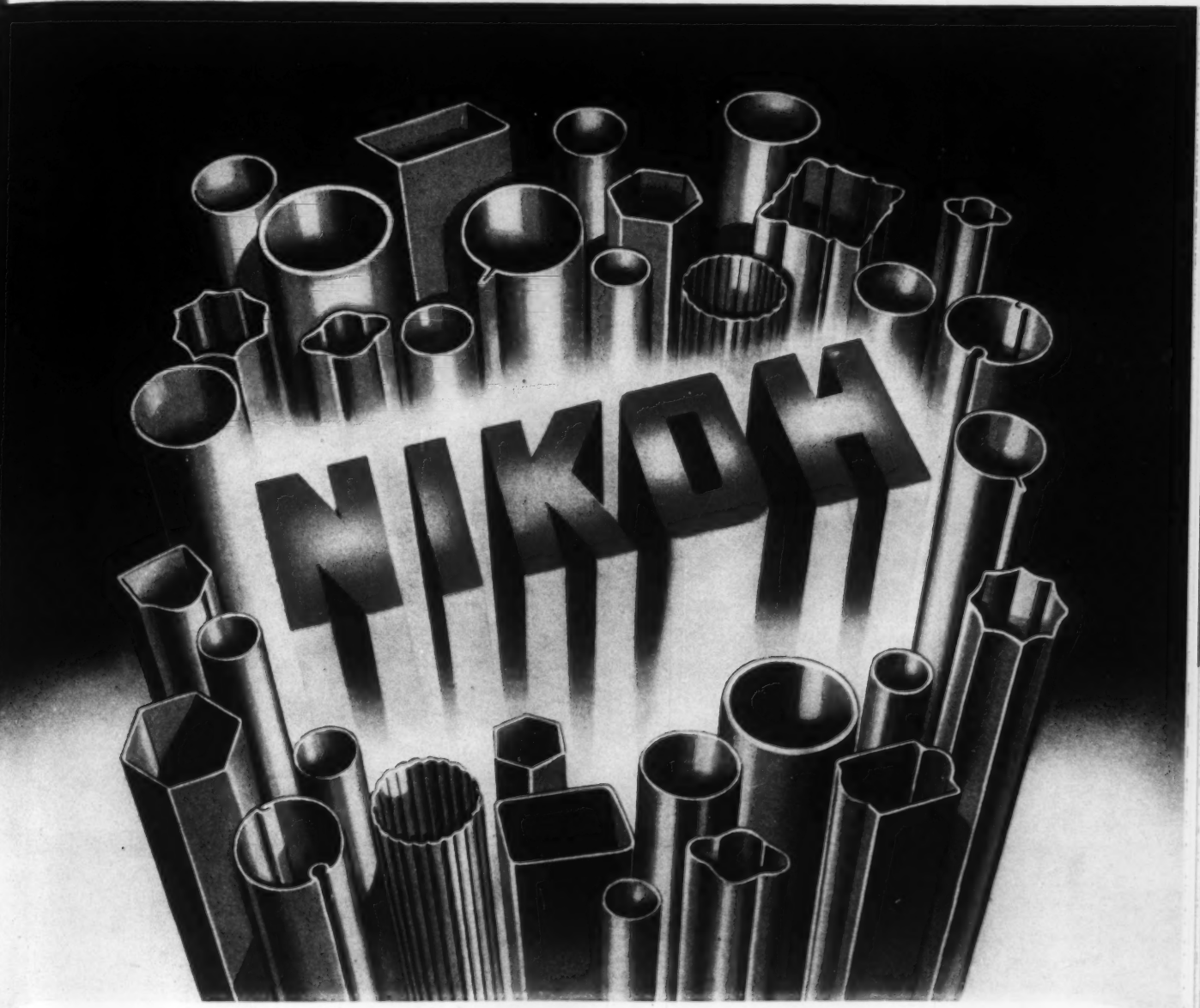

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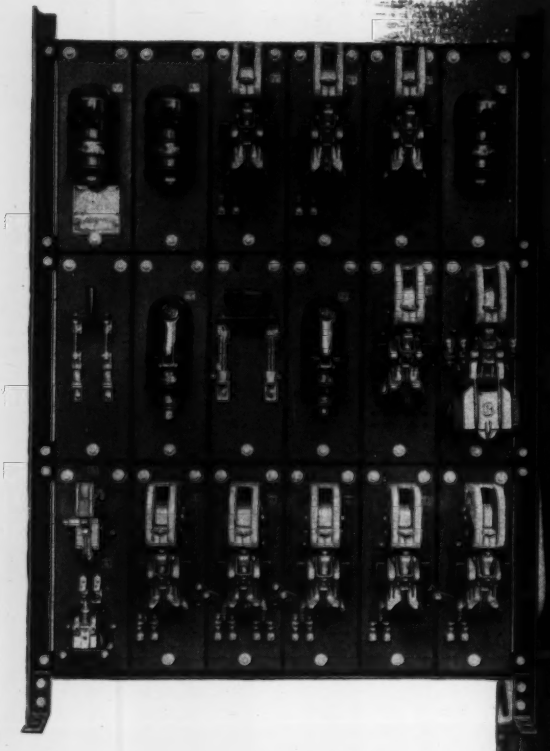

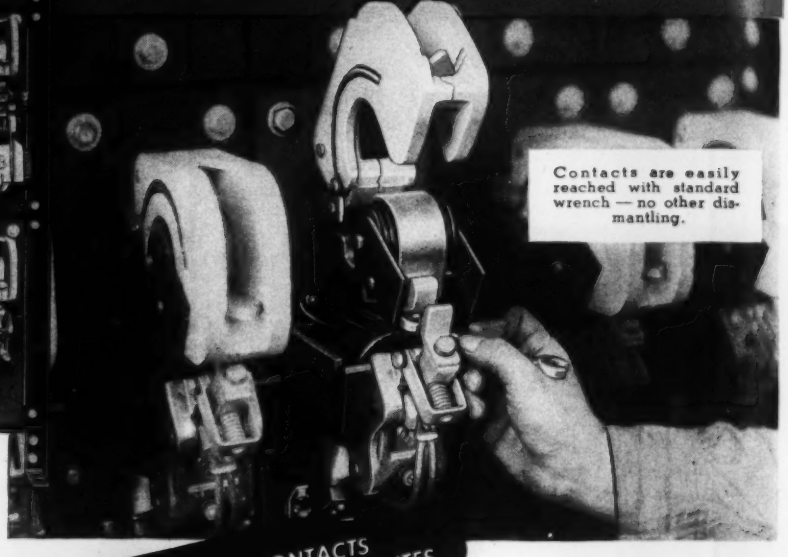

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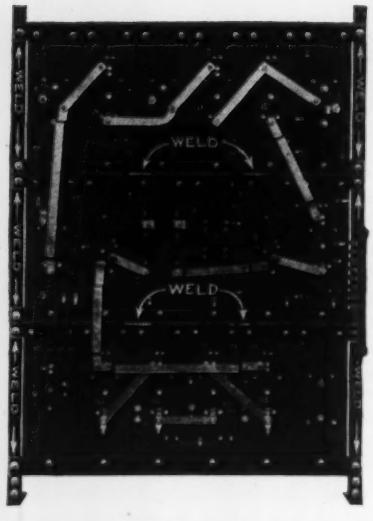

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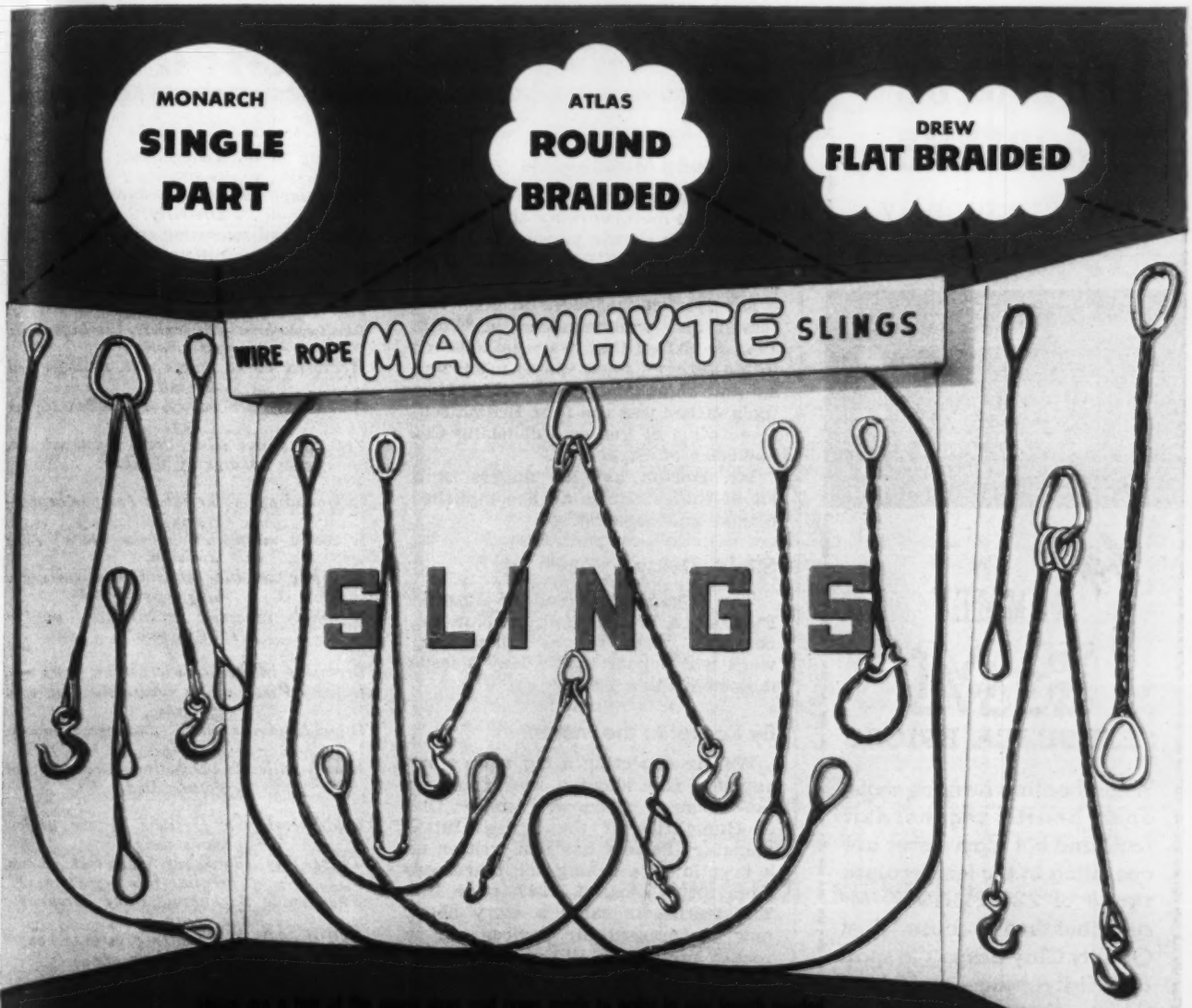

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Behind the Scenes . . .

Words and Music

Every week the editors take you on a quick metalworking trip abroad. Helping you on the journey is Joseph Arthur Horton, correspondent from Birmingham, England.

Mr. Horton was born in 1899 and served and was wounded in World War I. After that war, he followed in his father's footsteps as a journalist and shorthand writer. Mr. Horton's father was the first British representative of Penton Publishing Co., publisher of STEEL.

Mr. Horton has his fingers in a lot of things: He is an accomplished pianist and organist.

Slight Delay

The idea-filled spread of Russell, Burdsall & Ward Bolt & Nut Co. that we were talking about last week will appear in the May 1 issue instead of this issue.

By Rocket to the Moon

We are expecting a big news story any day now about a rocket trip to the moon or Mars or Venus. One J. Humphries of the British Interplanetary Society has just written us a cryptic note asking for tearsheets from STEEL, Aug. 1, 1949, page 104. The tearsheets carry a story about how compressed air devices aid in rocket production. When the British get to Mars, we want a news beat.

Puzzle Corner

In the puzzle of Apr. 10 about the clock, the faster hand travels 8½ turns before the two hands line up at 7 o'clock. Gene J. Krysko of Sonora Radio & Television Corp. and E. J. Sampson of Brockton, Mass., are among the many who made short work of that one.

Give your brain a whirl with this one. The aggregate age of the Joneses—Mr. Jones, Mrs. Jones, Jimmy Jones and Jenny Jones—is 97. A few years ago Mr. Jones' age was eight times Jimmy's age at the time. Jimmy was then one-seventh his mother's age. The difference between the family's aggregate age then and now is equal to Mr. Jones' age then. How old was Jenny then?

Poetry Corner

Poet Laureate Pat Dwyer Jr. tells of "The Bug That Launched a Thousand Ships":

Floating in the water down beneath the sea,
Swimming in the darkness somewhat aimlessly,
Floating and swimming in the Archaezoic times
Were the Leptothrixic legions, making Archaezoic slime.

The Leptothrix was sexless, the Leptothrix was small:
Measured but a single cell, a single cell was all!
It couldn't ever marry, it couldn't lay an egg,
Yet the clever little devil mustered offsprings by the keg.

Confounding mathematics (maybe in derision)
It coolly multiplied by the use of short division.
This bug was independent, as witness how it grew:
It simply squeezed its little self until it split in two!

Browsing in the ocean a billion years ago,
It fed on iron water where the iron used to grow,
It oxidized the metal, and grew an iron hide
Which settled to the bottom when the little creature died.

Underneath the pressure of the ancient ocean's weight
These tiny shards of iron met a most peculiar fate:
They made Archaezoic slime down upon the ocean floor,
Till the frightful water pressure changed the ooze to iron ore.

Swinging with the seasons, rolling round the sky,
The earth kept right on turning till the continents were dry;
And the Archaezoic slime, which had undergone a change,
Became the fundamentals of the Great Mesabi Range.

Floating in the water, down along the seas,
The iron ore was carried in endless argosies:
It was rafted, it was drafted, it was portaged, dragged and rowed
To the hungry mills that glimmered where ever water flowed.

The Leptothrix was ancient, the Leptothrix was small:
Measured but a single cell, a single cell was all!
But mainly on account of the stuff it ate for meals
The modern-world is rooted in the mighty Age of Steel!

Shrdlu

(Editorial Index—page 37)

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STEEL

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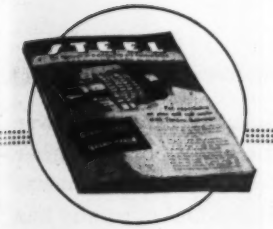


April 24, 1950

Anything but Monopoly

Judging from statements of investigators of United States Steel Corp. for the Celler committee, major purpose of current hearings is to develop facts to justify legislation which would force the corporation to be split into small units. Apparently the committee hopes to prove that U. S. Steel either is too big or exercises monopolistic advantages because of its bigness.

One would think that the easiest way to prove these claims would be to show that Big Steel's competitors have been injured by its bigness or its monopolistic practices. This cannot be proved because the opposite is true. Competing steel companies have thrived under U. S. Steel's alleged baneful competition.

One test of good performance in the steel industry is ability of a steel producer to operate at a high percentage of steelmaking capacity. During the past 12 years Inland Steel Co. has led the majors in this respect. It has held first place in seven years, second place in four years and third place one year. In per cent of operations to capacity during the past 12 years, Bethlehem Steel ranks second, Youngstown Sheet & Tube third, Jones & Laughlin fourth, Wheeling Steel fifth, Colorado Fuel & Iron sixth, Republic Steel seventh, U. S. Steel eighth and Armco ninth. National Steel is not rated because complete figures are not available.

Another test of successful performance is income per ton of ingots produced. Again Inland leads. During the past 10 years for which figures are available, Inland held first place six times, second place twice and third place twice. Runner-up was Armco, followed in order by Wheeling, Bethlehem, Youngstown, U. S. Steel, Jones & Laughlin, Colorado, Republic and Pittsburgh Steel. Again National Steel is not rated because of lack of data.

U. S. Steel's rank as eighth in per cent of operations to capacity and as sixth in income per ton of output indicates that if it is too big or too monopolistic, these attributes have been a handicap rather than an advantage.

If there are reasons for splitting up U. S. Steel they have little to do with bigness or monopoly. More likely they are reasons of efficiency in organization and operation, which are more directly the concern of the corporation's stockholders than of a congressional committee.

* * *

BETTER HOUSEKEEPING: An Air Pollution Conference will be held in the Department of Commerce auditorium May 3-5 under government auspices. About 80 papers are scheduled to be read in an extensive program which should be of interest to all manufacturers and users of anti-pollution devices, such as filters, collectors, dust precipitators, spray towers, scrubbers, incinerators, smokeless coal-burning apparatus, etc.

Industry has made encouraging progress in tackling its share of the pollution problem, but much remains to be done before it can be said to be under effective control. It has taken our comparatively young nation a long time to become aware of the social and economic importance of clearing up the atmosphere in industrial communities. In some localities in the United States there are conditions of serious air pollution which would not be tolerated for a minute in the comparable industrial areas of a dozen or more foreign countries. With a few excep-

(OVER)

tions, the United States is the world's worst industrial housekeeper.

This is bound to change. Public opinion will demand that all parties responsible for air pollution intensify their efforts to control it. Alert industrial management soon will realize that energetic co-operation in anti-pollution projects will become a "must" in sound public relations.

This means that in the future some companies must be prepared to budget more money for anti-pollution devices than previously had been considered necessary. It would be well to anticipate this contingency. —p. 57

* * *

WHY STEEL IS SCARCE: Federal Trade Commissioner James M. Mead testified at the steel hearings of the House Judiciary Committee that the shortage of steel "appears to be of sufficient importance to warrant an intensive analysis, which we at the commission recommend should be undertaken at the earliest possible moment." The immediate postwar shortage, he believes, is a continuing condition that is being used for monopolistic purposes.

This is pure bunkum. The commissioner knows full well that the industry has increased capacity by an appreciable extent since the end of the war and that the real reason that shortages have been prolonged is that strikes or other government espoused crises have bobbed up every time supply has begun to overtake demand. Remove these synthetic road blocks and we will witness an abundant supply of steel in a relatively short time. Steel operations were nearly 20 per cent below capacity in 1949.

—pp. 45, 47

* * *

NO UNIFORM PATTERN: This publication's twenty-fifth annual financial analysis of the steel industry provides a wealth of detailed information from which significant comparisons can be made. For instance, it is interesting to note the marked differences between the showings of individual companies.

In 1949 net earnings of 29 companies representing 92 per cent of the nation's ingot capacity were down only 2.7 per cent from the peak earnings of 1948. The decline in earnings was much less severe than that in the operating rate, which fell from 94.34 per cent of capacity in 1948 to 81.57 per cent in 1949. This reflects the effect of operating economies.

In contrast to the good showing of the industry as a whole is the fact that in 1949 two of the 29 companies reported deficits, 19 reported lower earnings than in 1948 and eight reported higher earnings. These marked differences emphasize the degree to which each individual company has its own peculiar problems. It is unrealistic to think that all units ever can conform to the same pattern. —Facing p. 52

* * *

LUBRICATING BY "MIST": Every time the still young American Society of Lubrication Engineers holds its annual convention and show, fresh evidence is submitted to emphasize the importance of sound lubrication practice to the American system of manufacture. Papers presented at the 1950 meeting and exhibit in Detroit lent additional weight to this point.

Among them was an exposition of the merits of "mist" lubrication. The idea is to introduce oil into bearings through a lubricator which atomizes oil by air pressure. The resultant mist is delivered to a group of bearings in a given machine. Bearings are lubricated and ventilated by a constant film of fresh oil. This vaporizing is claimed to cut oil consumption by as much as 90 per cent and to increase bearing life from 400 to 7000 hours. —p. 51

* * *

SYSTEMATIC NUMBERING: When a salesman tries to sell you an automobile, refrigerator, television set or machine tool, does the fact the model being shown is numbered 136-R1 mean anything to you? Bryant Chucking Grinder Co. thinks there is room for improvement in the method of numbering models. It has adopted a system which is easy for salesmen, distributors and customers to understand.

In the Bryant system the first of the four digits of the number designates the design. Present design is 1; when the machine is redesigned the first digit changes to 2. The second digit designates type of machine—0 meaning manual, 1 semiautomatic, 2 automatic, etc. The third and fourth digits designate the swing of the machine in inches. Thus the number 2209 indicates second design, automatic and with a 9-inch swing.

The idea of making the numbering of models more descriptive is sound and could be adopted with profit by many manufacturers of machines and equipment. —p. 78

E. L. Shaner

EDITOR-IN-CHIEF

News Summary

CUT TO SIZE—Chairman Celler of the House Judiciary Committee wants amendments to the antitrust laws that will permit the government to dissolve a corporation that has the size and power to dominate or lessen competition (p. 45). He plans to marshal his facts and supporting arguments for these tighter laws from the testimony now being heard by his committee in its investigations of the economic power held by U. S. Steel Corp. Although U. S. Steel is bearing the brunt of Mr. Celler's attack at the moment, big companies in every industry are the congressman's real targets.

STEEL DOLLARS—Earnings of 29 steel companies having more than 92 per cent of the nation's ingot capacity fell to $514,133,177 last year from the alltime high of $528,357,192 in 1948 (see STEEL's financial analysis following p. 52). The decline in earnings resulted from the midyear recession in 1949 and the strike. Measured by net earnings per dollar of sales, 1949 was the best year the industry has had since 1940. Operating economies account for that showing.

ROSE-COLORED GLASSES—At the start of this year, many forecasters were accused of being too optimistic about future business. The facts now show that few were optimistic enough (pp. 62-65). Further increase in the Federal Reserve Board's industrial production index is expected in April. Despite the drag from the Chrysler strike, the auto industry is moving at a fast pace. Some steel products are hard to get again. Engineering construction is running at a rate 39 per cent above that for last year. March was the biggest homebuilding month in history. Even the traditionally pessimistic machine tool industry is cautiously optimistic (p. 49).

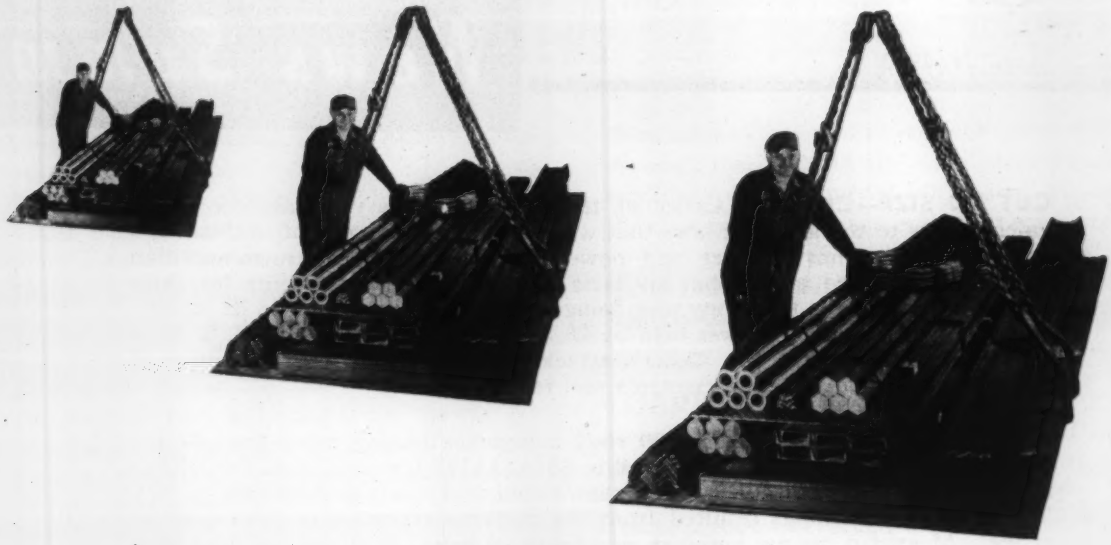
TRIAL AND ERROR—Developmental work on the continuous casting of steel is progressing at the Republic Steel and Babcock & Wilcox plant in Beaver Falls, Pa. (p. 46). The economic future of the process still hinges on further engineering refinements.

OIL MIST—Look into new lubricating methods that may cut costs (p. 51). Oil mist lubrication of machine bearings may cut oil consumption by as much as 90 per cent and increase bearing life. Lubrication engineers attending a Detroit meeting were told about a simple and compact system, comprising a lubricator that atomizes oil through air pressure, to deliver the mist to the bearings.

LABOR'S LOVE LOST—Usually quiet labor groups in Britain and West Germany and tumultuous unions in France may all explode this summer (p. 52). British shipbuilding workers and railway men especially are dissatisfied with the government's wage freeze policy. Ruhr workers want a greater voice in management. The Communists will be trying to stir up labor trouble in France in another few months.

NEW MILL IN CHICAGO—Watch the news from Chicago. A new steel company is dickering with the government for a brass plant in Chicago operated by Revere Copper & Brass Inc. during World War II. The plant, a 376,000 square foot facility built by the U. S. at a cost of $10.6 million, would be converted to produce cold-rolled steel strip. The new company will get hot-rolled coils from sources outside Chicago.

HERE AND THERE IN INDUSTRY—The Chrysler strike losses come close to $1035 million (p. 59) . . . Carnegie-Illinois Steel Corp. will increase the capacity of its Gary, Ind., sheet and tin mill by 120,000 tons annually (p. 50) . . . ICC hearings on proposed eastern rail freight decreases on some steel products began last week (p. 48) . . . The sleeper in the Oleomargarine Act that boosts the fine for failure to obey FTC cease-and-desist orders may not be used much, but it is another whip over business (p. 54) . . . Negotiations for lease of land in Maine for a possible source of manganese ore are reported being made by Republic Steel Corp. (p. 53) . . . Armco Steel Corp. has designed a materials handling system for feeding open-hearth furnaces with scrap and other materials that will cut in half the time required to charge 150 tons of scrap into a furnace.



How to Lower Your Steel Costs

Have you considered revising your steel buying policies in the light of our current prices? Many steel users are making changes, because there are now additional savings to be gained by eliminating small lots from mill orders and grouping these items with a dependable warehouse source.

Here are a few facts that should prove helpful:

1. Because of differences in mill and warehouse operations, mill prices* are based on the individual weight of each item while Ryerson warehouse prices enable steel users to obtain a quantity discount on the total weight of all hot rolled carbon steel products shipped to one place at one time.
   This fact, together with recent changes which have further altered the relationship between mill prices and our warehouse prices, now make it possible to buy certain quantities of many products from our steel-service plants for little or no more than from mill. And you get the steel from stock at once.
2. When buying from us you purchase steel just as you need it. In this way you avoid tying up capital which may be needed elsewhere.

* As published in a recent issue of Iron Age.

3. Warehouse purchasing allows you to hold your inventory at a practical working level, thereby eliminating the possibility of loss from changes in product design or market conditions.
4. Ryerson plants—with steel in stock from many mills, make it possible for you to group your purchasing of all current requirements. With one order, one invoice and one shipment covering a whole group of steel products, substantial savings can be effected.
5. There's no waiting for steel from Ryerson. Every requirement can be taken from stock, cut to size and shipped promptly, often preventing expensive delays in production.

Ryerson nation-wide steel-service plants make it possible for you to take full advantage of this money-saving method of steel buying. Our representatives—well schooled in steel price relationships—will gladly advise you on how to purchase your steel most economically. Our stocks are the nation's largest, our cutting and handling facilities modern and complete. Whether your order is large or small, prompt, personal attention and quick delivery are always yours.

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Tighten Trust Laws, Says Celler

Chairman of House Judiciary Committee investigating economic power of U. S. Steel wants law that would break up the Mr. Bigs of every industry

SALT from the Celler committee's hearings on alleged monopolistic power held by the U. S. Steel Corp. will do far more than season the government's campaign against the steel corporation. It will flavor the federal course served to Mr. Big in every industry.

From the steel hearings that began Apr. 17, Chairman Emanuel Celler (Dem., N. Y.) of the House Judiciary Committee plans to assemble his facts and supporting arguments for an antitrust law amendment that would give the government authority to dissolve a corporation on the showing that it has the size and power to dominate or lessen competition. Proof that contemplated dissolution would result in lowered efficiency would be a complete defense against the action to break up a corporation.

Music to Their Ears—Mr. Celler and his disciples on the committee were delighted with the testimony of an early witness. George J. Stigler, professor of economics at Columbia University, says "the forces of competition in the steel industry are not sufficiently strong to justify us to leave the industry alone." Like Mr. Celler, he believes that big corporations cannot be broken up effectually into smaller units without a change in antitrust laws. He says the amendment should be in terms to permit action against any large company, not just U. S. Steel.

Strongly opposed to nationalization of steel is Dr. Stigler. Government ownership would make the present situation even worse. While U. S. Steel now controls about one-third of the industry, nationalization would throw the entire industry under one overall management appointed by the government. Such an arrangement would remove competition.

Solid Labor—The Columbia professor says a break-up of U. S. Steel would not be sufficient without a break-up of the United Steelworkers' union. His idea is that there should be a separate union for each steel company. Charles M. White, Republic Steel Corp. president, says the CIO steelworkers have a "bigger" monopoly in the steel industry than any steelmaking company was ever accused of having.

U. S. Steel might be broken into as many as 50 companies. How stockholders' interest could be fairly distributed is a knotty question that Dr. Stigler couldn't answer specifically. He thinks that at least a portion of the ore holdings of U. S. Steel should be assigned to a separate company whose only business would be iron ore and which would sell ore to anybody. He says that would cure a situation in which U. S. Steel, by owning a large percentage of the Mesabi ore, is in a position to influence the policies of the other steel companies to which it sells.

Trouble in Triplicate—Iron ore is one of three aspects to the monopoly problem in the steel industry, says Federal Trade Commissioner James M. Mead. His testimony and that of others discloses that U. S. Steel's Oliver Iron Mining Co. in 1944 shipped 56.5 per cent of the Minnesota ore sent down the lakes that year. Pickands Mather & Co. shipped 12.7 per cent and M. A. Hanna Co. 6.3 per cent.

Mr. Mead says the second aspect of the monopoly problem is the increasing trend toward acquisition of their customers by the large steel companies. He charges big steel companies have control over the nation's capacity in such lines as steel drums and fabricated structural steel. (For more about this subject, please turn to Page 57.) Messrs. Mead and Celler hold that in studying steel monopoly, activities of Bethlehem Steel Co. and Republic Steel Corp. must be considered, too, because they are the second and third largest producers.

You'll function better, friend, in pieces

Perennial Problem—Mr. Mead says that the continued shortage of steel—the third aspect of the monopoly problem—"appears to be of sufficient importance to warrant an intensive analysis, which we at the commission recommend should be undertaken at the earliest possible moment." The immediate postwar shortage is a continuing condition, the commissioner believes, that is being used for monopolistic purposes.

From Messrs. Stigler and Mead, Mr. Celler heard what he wanted to hear—that the economic power possessed by U. S. Steel is dangerous to the public welfare. Dissenting comments came from Oscar Chapman, secretary of the interior; James Boyd, director of the Bureau of Mines, and H. B. McCoy, director of Commerce Department's Office of Domestic Commerce.

The Other Side of the Coin—Secretary Chapman believes that "to a certain degree the steel situation has been competitive"—adding "but not fully so." Mr. Boyd says that plants for the processing of taconite and development of foreign ore deposits require heavy capital investments. U. S. Steel has contended in other hearings that its size is justified in that it could not undertake large development programs such as in Venezuela if it were smaller and had less financial resources. Even Mr. Celler bows to this stand. "If bigness is needed to develop new iron ore, then let's have bigness," he says. "But let's make sure that the smaller entities are protected."

Mr. McCoy thinks that the steel industry is competitive, that the size of U. S. Steel and its influence over prices are diminishing and that "as long as a corporation is conducting its business legally, it should not be proceeded against for size alone."

Help Wanted for Georgia Ore

A plea for government assistance in establishing an iron ore treatment plant in northwest Georgia was heard last week by the House Judiciary Committee investigating U. S. Steel Corp.

Garland Peyton, Georgia state

geologist, says that the brown ore in that area, estimated at 100 million to 125 million tons, could easily be concentrated to a blast furnace raw material containing over 50 per cent iron and up to 5 per cent manganese, and low in phosphorus. If the government would agree to stockpile surplus production, the miners in the district could get together and install the necessary facilities.

Mr. Peyton reports that Republic Steel Corp. and U. S. Steel Corp.'s Tennessee Coal, Iron & Railroad Co. buy some of this ore, but irregularly.

The same difficulties hamper development of manganese deposits near Cartersville, Ga., which Mr. Peyton estimates at 200,000 tons of ore containing 35 per cent or more manganese, 500,000 tons containing 10 to 35 per cent and 150,000 tons containing 5 to 10 per cent. TVA, he says, has developed a magnetic roasting process to convert this material—at an average cost of $1.50 a ton of ore—into two grades of concentrates.

Steel Price Rise Moderate

Mention of a steel price increase can always be counted on to detonate a blast from government officials and a bang-up investigation by congressional groups.

But actually how much have steel prices risen?

About 60 to 70 per cent since 1939, says the American Iron & Steel Institute. The variation depends on what index is used.

At the same time, wholesale commodities rose an average of about 97 per cent.

Even the rise of 4 per cent in the average of all steel prices at the end of 1949 left a substantial margin below the advances of most other goods.

Aside from the smaller percentage of increase in iron and steel prices, the latter are characterized by the lag in time of their rise behind the rise in prices as a whole in the past decade. Resistance of steel prices to the general inflationary movement of the postwar period is well illustrated, the institute asserts, in the comparison between steel and raw materials. The latter, reflecting significant costs to the iron and steel industry, remain more than double the immediate prewar level, even after some recession from their peak.

Sales prices of finished manufactured commodities, which the institute points out also have gone up more than iron and steel, represent another segment of costs in metal production. The iron and steel industry's needs range from common salt to 5000 horsepower motors.

NEA

POWERHOUSE: Developed by the Air Force, this 10,000 hp-plus XT-37 engine is given a check in the test chamber of Turbodyne Corp., Hawthorne, Calif. It is somewhat like a turbojet engine but delivers its power on a shaft that can be used to turn a propeller. Here you can see the counter-rotating propeller, gearing mechanism and controls needed for actual flight installation

Continuous Casting

Iron & Steel Engineers hear of progress at Babcock & Wilcox, Republic plant

PROGRESS in experimental continuous casting of steel was described to 250 iron and steel engineers when they toured the Republic Steel and Babcock & Wilcox plant at Beaver Falls, Pa., Apr. 17.

Isaac Harter, B & W chairman, says that after many months spent in verifying or disproving the various steps in the process, its sponsors are ready to enlarge their testing facilities. Mr. Harter explained what has been done since the original pilot plant was moved from the Cleveland Works of Republic Steel to Beaver Falls and what is being done to bring the process to a commercial basis. He spoke at a dinner meeting of the Pittsburgh and Cleveland district sections of the Association of Iron & Steel Engineers at the Brodhead Hotel in Beaver Falls.

Shrinks Free—The original induction-type holding furnace provided metal for only a 15-minute casting cycle and this unit now has been replaced with a 7-ton Swindell arc furnace.

Mr. Harter emphasized that the casting rate of the cross-section and the area are the determining factors of mold length. The metal, he explained, develops a wall thickness about ¼-inch below the surface and then shrinks and frees itself from the mold wall.

Lip Service—The speaker in discussing the tundish pointed out that the lip furnace type gives the best service. When nozzles were used they either froze or broke. It has been found that lip pouring gives better control of the variables. A pour rate of 30 inches per minute is an important factor in the control of the process, although in many cases the pilot plant has been operated on a pour of 60 inches per minute.

Under present practice an x-ray beam directed across the level of the metal in the mold is tied in with a solenoid that controls the tilting mechanism of the electric furnace. A television camera mounted some distance above the mold and sighted on its interior affords the operator a check of the level of the metal in the mold at all times. Castor oil added at the top of the mold prevents the metal from sticking to the mold walls and a stream of gas added at the same location serves to prevent any oxidation of the metal.

Lower Floor—A proposed production plant will have the level of the casting floor about 40 feet above ground level compared with 75 feet at present. Instead of making heats in electric furnaces at ground level and elevating the hot metal to the casting floor, proposed plans call for making the heat on the casting floor. Other changes involve the equipment and include an automatic cut-

off device and the elimination of the lowering trough to permit the cut sections to be delivered directly to the runout table.

More Steel Coming

For expansion, improvement steel industry spending more per worker than all industry

IF YOU can't get all the steel you want when you want it, don't lose hope for the future.

The steel industry is still expanding and making improvements and in doing so is spending more per employee than industry as a whole. For these the steel industry's expenditures this year will be about $750 for each worker engaged in the production and sale of iron and steel, says the American Iron & Steel Institute.

The $750 rate does not include steel company spending for mining, shipbuilding and other non-steelmaking activities. It is based on planned expenditures for new plants and equipment in the iron and steel industry this year of $468 million, down 8 per cent from last year.

The all-industry expenditure for 1950 is expected to be about $420 per worker; $450 per worker in manufacturing industries only.

The highest annual total expenditure by iron and steel companies for new plants and equipment was $583 million in 1948, amounting to over $900 per employee.

Mill Rolls Interchangeable

A single stand 28-inch combination 2 and 4-high mill with interchangeable rolls for rolling of aluminum sheet and bars will be in operation this fall at Alcoa's research laboratories, New Kensington, Pa. The mill will be used for experimental rolling of newly developed aluminum alloy samples to determine rolling characteristics, as well as analyzing effect of same on metallurgical qualities such as fatigue, tensile strength, etc.

Cold Sheets Major Steel Item

Cold-rolled steel sheets were the No. 1 item tonnagewise in steel mill shipments in 1949.

They totaled nearly 6,887,000 net tons and constituted 11.8 per cent of all finished steel shipped from mills that year, the American Iron & Steel Institute reports. This is about double the average percentage prior to the war. The 1949 shipments exceeded 1948's outgo by a small margin despite the decrease of nearly 12 per cent in total steel shipments.

Cold-rolled sheets are used mainly in automobiles, refrigerators and other consumer goods.

Shipments of steel pipe set a record last year. Total of all kinds of steel pipe was 6,935,220 tons, an increase of 53,761 tons over 1948. Pipe constituted 12 per cent of total steel shipments last year, compared with 10.4 per cent in 1948.

Line pipe, formerly second or third in tonnage among the various kinds of pipe, moved up to first place in 1948 and increased its lead in 1949. Line pipe has been in strong demand in the last few years for construction of long distance pipe lines for oil and gas.

Largest tonnage increase over 1948 was in shipments of galvanized steel sheets. They totaled 1,755,000 net tons, 112,000 tons more than in 1948.

Shipments of electrolytic tin plate in 1949 exceeded those of hot-dipped tin and terne plate for the first time.

Foundries Use Tenth of Pig Iron

Foundries represent about 10 per cent of the total customers of the nation's iron and steel companies and take about 10 per cent of their pig iron production.

Of the more than 30,000 customers of the iron and steel companies in the United States approximately 3000 are foundries, the American Iron & Steel Institute says. Iron shipped to these foundries makes up about 10 per cent of all pig iron production, the remaining 90 per cent going to steelmaking furnaces.

In the last ten years the foundries have taken 54 million tons of pig iron. During those ten years those 3000 foundries, the institute adds, made approximately 126 million tons of gray iron, malleable and steel castings. They ranged from small toys to huge castings for special machinery. Highest year of output in that period was 1948 when more than 15 million tons of castings were produced.

Dollar Stretcher

U. S. Rubber Co. must have been thinking of inflation when it put out a dollar that will stretch. It's a rubber bill being sent to its 50,000 employees in this country.

The dollar has no monetary value. It gives employees financial facts about their company to help them understand what makes business tick. The dollar shows how the company spent the $517,439,676 it collected from customers in 1949—57.5 cents out of every dollar went for materials and services; 35.5 cents went for employees' pay and benefits; 2.5 cents for wear and tear; 1.5 cents for federal and foreign income taxes; 2 cents for dividends to stockholders; and 1 cent for profit plowed back into the business.

Chile Furnace Soon in Blast

Chile's first integrated steel plant, erected for Pacific Steel Co. of Chile near Concepcion, will blow in its blast furnace during the first week in May.

The whole plant will be in operation some time in June, says Joseph Becker, vice president and general manager of engineering and construction division of Koppers Co. Inc., Pittsburgh. First coke from a new battery of 57 Koppers underjet ovens, rated 1100 tons daily, was produced last week. The blast furnace is rated at 700 tons daily. Mills for finishing a wide variety of flat-rolled and merchant products at Concepcion have been in operation for some time, using semifinished steel shipped to Chile from United States.

Work on the first Chilean steel mill was inaugurated late in 1947 and has been pushed to completion at cost in excess of $70 million.

American Gets Another Award

American Welding & Mfg. Co., Warren, O., is proud of itself. It received its second Distinguished Service to Safety Award from the National Safety Council. Only 99 companies in the country have ever received the second award.

Cunningham Will Keynote ASME

James D. Cunningham, president of the American Society of Mechanical Engineers, will visit Pittsburgh to give the keynote address at the 1950 Process Industries Division and Pittsburgh Mechanical Engineering Conference, Apr. 24-27.

Mr. Cunningham will speak on "The Engineer's Civic Responsibilities" at the conference banquet.

Other speakers will deliver papers on technical phases of process and engineering industries during the four-day sessions. Many papers and panel discussions that follow will deal with engineering problems affecting public welfare.

Railroads vs. Trucks

Rail carriers ask curbs on motor haulers. Decision on freight rate cuts near

THE railroads have hauled their case against heavy trucks into Congress.

Testimony designed to show that "highway freighters" are damaging the nation's highways without contributing to their support was presented to a subcommittee of the Senate Commerce Committee by David I. Mackie, general counsel of the Dela-

ware, Lackawanna & Western Railroad.

"Recent studies conducted in various states," he testified, "leave no doubt that the heavier motor vehicles are paying far less than their fair share of highway costs and are thus recipients of substantial subsidies from the states, either at the expense of other motor vehicle operators or at the expense of both other operators and the general taxpayers."

Curbs for Trucks—Mr. Mackie outlined a 5-point program to implement his argument: 1. Impose a highway users excise tax on all heavy vehicles; 2. eliminate subsidies on the state levels; 3. require motor carriers to carry a manifest of cargo lading and weight; 4. appropriate funds to set up weighing and other checking equipment; 5. remove the so-called inequalities in regulation of trucks and railroads.

The railroads are awaiting decision by the Interstate Commerce Commission on a petition to reduce rail rates on selected steel products by an average of 25 per cent in a move admittedly made to meet truck competition. A ruling by the ICC is expected by Apr. 28.

Motor carriers oppose the proposed rail reductions. They say it would drive a majority of the steel truckers out of business.

Must Report Car Repairs

Seeing a growing freight car shortage, the Interstate Commerce Commission took steps to learn which railroads are holding cars needing repairs. It ordered a periodic survey of inactive cars.

All Class I railroads with more than 5 per cent of their total car ownership in an unserviceable condition must report frequently to the ICC the full details on the number of freight cars needing repairs. The surveys are to be made until Aug. 15.

On Mar. 1 Class I railroads had 138,821 freight cars idle for want of repairs. This was a 52 per cent increase over the number inactive for repairs on the corresponding date last year.

Shortages of freight cars, particularly box, gondola, hopper and flat cars, have grown recently, and the increasing demand will create further shortages, the commission says.

Alaska Railroad Cuts Rates

The Alaska Railroad has reduced carload rates. The new tariff lowers rates on carload shipments between Seward and Fairbanks from $2.31 to $1.85 per cwt; proportionate cuts to other points. Large tonnages of steel, steel products and building materials are being shipped to Alaska.

Scrap Problems Probed

Diagnosis of the scrap industry's ailments came out of a consultation among some of its best doctors. Directors of the Institute of Scrap Iron & Steel are working on a prescription which they hope the patient will heed. They want to cure the mills' aversion to dealer scrap.

As described by Stanley Kaplan, national president, the program for improving the industry's outlook has been developed on the basis of answers to a questionnaire which every member received. The association's objectives are: Obtain a reduction in freight rates on scrap shipments; improve the quality of scrap and set up new standards; formulate and enlarge safety programs; educate everyone to the conservation aspects of scrap.

Mr. Kaplan, speaking at a Chicago dinner in his honor as the youngest president and the first from that area, stated that results of the first objective will soon be seen. A 20-25 per cent freight rate reduction is expected. The second goal, improvement of quality and formulation of better standards, is a job of such magnitude as to require the combined efforts of all. Purpose is to make dealer scrap more acceptable to consumers.

Flying Saucers

There is a flying saucer!

Erie Railroad says so.

If you watch for it you may see it whooshing back and forth between New York and Chicago.

The "flying saucer," Erie explains, is the atomic age designation that railroad employees gave to train No. 97. It is the new, fast, diesel-powered freight train Erie put on to meet truck competition. It steps up speed of freight service to provide second-morning delivery in Chicago of less-than-carload freight from New York.

Quality Control Cuts Costs

How to cut costs through quality control will be demonstrated at the national convention and midwest conference of the American Society for Quality Control in Milwaukee June 1-2.

Machines will be demonstrated actually making piece parts to which the controls will be applied. You will actually see how control is assured for specific operations and how the techniques provide warning evidence of impending troubles before they actually result in scrap or rework.

Ten clinics at the convention will provide information on: Contribution to engineering economy; installing a quality control system; acceptance inspection and other subjects.

Materials Handling Show for '51

The fourth National Materials Handling Exposition—which in three years grew to rank among the five largest industrial shows in the country—will be held in the International Amphitheatre, Chicago, Apr. 30 to May 4, 1951. Displays will cover ten acres and will provide the most extensive display of operating cost reduction machinery ever assembled.

Announcement was made by Clapp & Poliak Inc., New York, the exposition management. The Materials Handling Institute will sponsor the exposition. Concurrently with the show, a conference will be conducted with nationally known specialists on new techniques in materials handling and related fields. The conference will be developed by the American Materials Handling Society.

Machine Tool Business Looking Up

Distributors, meeting in Chicago, are cautiously optimistic on prospects for year. Inquiries are increasing, although volume still is far below peaks

NINETEEN-FIFTY will be a better year than 1949 for machine tool men. Reports from most sections are that inquiries are increasing. If these materialize as sales, builders and distributors will shake off part of the gloom which has surrounded them since the war.

(New orders index of the National Machine Tool Builders' Association in March rose to 107.4, highest since April, 1946. See Page 62).

But the improved outlook is strictly relative. Builders' facilities are being used at only about 40 per cent of capacity. Caution tempered optimism among members of the American Machine Tool Distributors' Association at their 26th annual spring meeting at the Edgewater Beach Hotel, Chicago, Apr. 13-14.

Save by Spending—Tell Berna, National Machine Tool Builders' forceful general manager, told the distributors present-day requirement of machine tool sales work is an improved presentation which gives the prospect the facts that prove a new machine is a bargain, or, conversely, that an old machine is a liability.

Available to tool salesmen are various replacement formulas which show how direct labor cost and other factors of production cost are forced sharply lower by replacement of obsolete machine tools. Serious threat to industry is held by the increase of obsolescence among tools, he warned.

Lively Here, Dull Abroad—Domestic market for new standard tools, he stated, will be "pretty lively" this year. But the foreign market is in a bad way. Two factors—the dollar shortage and a desire to be self-reliant—cause lagging foreign demand. Serious results are not only the lack of business for American builders but the loss of trained foreign distributors.

Critical of the government, which Mr. Berna contends is quick to take actions that harm the U. S. tool industry and does nothing to aid it, he advocated these government policies: 1. Remove unnecessary handicaps. He cited activity of the FBI in seeking information to prove antitrust violation, illegal patent agreements. Some in the industry complain that government prying often amounts to "fishing expeditions."

NEW OFFICERS: American Society of Tool Engineers officers for 1950-51 are: (front row, left to right) H. E. Collins, Hughes Tool Co., Houston, first vice president of ASTE; H. L. Tiggis, Baker Bros., Toledo, O., president; J. J. Demuth, Sligo Inc., St. Louis, second vice president; (rear, left to right) George A. Goodwin, Standard Electric Co., Dayton, O., treasurer; Roger F. Waindle, Elgin National Watch Co., Aurora, Ill., third vice president; W. B. McClellan, Gairing Tool Co., Detroit, secretary; W. A. Thomas, Ford Motor Co. of Canada, Windsor, Ont., assistant secretary-treasurer

2. Revise depreciation policies. All other countries have more progressive legislation than we, he declared, adding that no overhaul seems likely in this session of Congress.

No Liability in Lean Years — Advantages of pension and profit-sharing trusts in machine tool sales organizations were explained by Frederick B. Scott, president, Syracuse Supply Co., Syracuse, N. Y. Properly drawn, a retirement plan offers real benefits to the company as well as to the employees, he asserted. A plan "need not be a liability in lean years;" it may be set up so that if no profits are made no payments into the fund will be made. Such an arrangement, he said, acts as an incentive and has more appeal to younger employees. A plan has a stabilizing effect on employees, this being of particular benefit in technical organizations where turnover is costliest.

Optimism of machine tool salesmen was evident in regional reports on business conditions presented at the AMTDA meeting.

As Salesmen See the Market

The section with the bleakest outlook is the West Coast where the bulk of tool buying would be for aircraft production. Government spending holds the key in the region and estimates are that new tool buying around Seattle is 25 per cent below last year. The Los Angeles situation is better, distributors characterizing business as "fair to good" in first half, unpredictable in second.

On the East Coast spotty conditions are reported, and tool sellers are disappointed over the absence of business they expected. Orders are for smaller sizes; heavy machines are not moving. Conditions compare with the fall of 1949. Around Buffalo expectations are that first half will see good sales totals rung up. Standard tool sales are lower, but quotations on specials are increasing. Farther inland, in the Cleveland-Pittsburgh area, inquiries and quotations are holding up well; sales, though "are not too good."

Detroit area business is reported not up to its normal average, but improvement is looked for. The Chrysler strike choked off some business but considerable experimental work is in progress and inquiries are numerous. Around St. Louis tool men say sales are 30-35 per cent better than last year at this time; inquiries are on a par. Small companies are doing virtually no ordering. Only standard machines are active. St. Paul business is considerably ahead of last year, both inquiries and sales showing improvement. A good 1950 for this region is in prospect.

More Tinning Capacity

That's what Carnegie-Illinois plans with interlocking projects at Gary and Chicago

CARNEGIE-ILLINOIS Steel Corp. will increase the capacity of its Gary, Ind., sheet and tin mill by 120,000 tons annually.

New facilities will make the plant's annual capacity 732,000 tons. An interlocking project is one at the South Chicago plant where extensive improvements will be made on the 44-inch slabbing mill. The South Works improvements are specifically designed to provide additional slabs for processing at the Gary sheet and tin mill. The slabbing mill will increase the plant's rated slab capacity by 150,000 tons to about 1,560,000 tons annually.

At the Gary plant a fourth electrolytic tinning line will be installed. The line will operate 1000-feet per minute in providing one-quarter pound of tin coating to each 100 pounds of basic steel sheets. A continuous annealing furnace will also be installed, the first of its kind in any Carnegie-Illinois plant.

Steel Co. of Canada To Expand

Expansion plans involving large expenditures are being considered by the directors of the Steel Co. of Canada Ltd., Hamilton, Ont. The expansion would be made whenever the time seems suitable to proceed, the company says in its annual report.

Expansion the company believes, is warranted in view of steel imports: In 1949 they were equivalent in ingot tonnage to more than one-third of all the steel consumed in Canada.

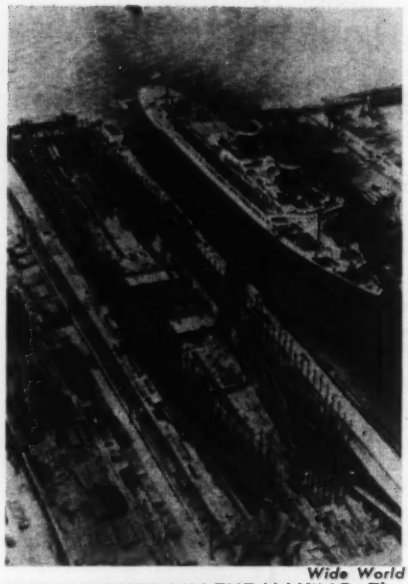
The company's new plant construction in 1949 amounted to $3,995,000. The more important expenditures consisted of amounts to complete continuous cold-reducing strip mills and blast furnace blowing equipment.

Two Plan To Buy Coal Mine

Steel Co. of Canada Ltd. and Youngstown Sheet & Tube Co. plan to buy the Hillman Coal & Coke Co.'s Ontario mine near Ellsworth, Pa., to build up their coal supplies.

Frank Purnell, president of Sheet & Tube, said negotiations for the purchase are underway but that the deal has not been closed.

The Ontario mine has a daily output of 2500 tons. Sheet & Tube would get 1600 or 1700 tons of this, Steel Co. of Canada, the rest, it is understood.



Wide World

MARINE QUEEN IN THE MAKING: The *S. S. America*, largest of the U. S. merchant fleet, is overshadowed by her sister-ship-to-be as the *America* slips into drydock for her annual overhaul. Alongside her in the Newport News Shipbuilding & Dry Dock yards is the partially completed hull of the *S. S. United States* superliner that will be 257 feet longer than the *America*

Crise, Acro Switch Merge

Crise Mfg. Co., Columbus, O., producer of temperature control equipment, merged with Acro Switch Co., formerly of Cleveland, early this month.

Acro Switch is now located in Columbus adjacent to the Crise plant. Col. William F. Rockwell, board chairman of Rockwell Mfg. Co., Pittsburgh, is a member of the board of Crise Mfg.

Kaiser Mill Sets Record

The Kaiser rolling mill in Spokane, Wash., operating since 1942, shipped in excess of 30 million pounds of aluminum sheet, plates and other aluminum items since March, establishing an alltime record. Employment is at the record level of 2450. The nearby Mead reduction plant also has been operating at capacity for the last six months.

Nash-Christian Back in Action

Six weeks after its plant was destroyed by fire, Nash-Christian Foundry Supply Co., Birmingham, was in production again.

Rehabilitation of the plant was completed by Rust Engineering Co., Birmingham and Pittsburgh. The plant was completely redesigned and rebuilt, new packing equipment, new material handling equipment and five concrete storage silos being added in the rehabilitation program. Salvaged equipment was used where possible.

The entire reconstruction of the plant was finished ten weeks after the fire.

Romos Buys Into Sidney Tool

Romos Enterprises Inc., Cincinnati, acquired a controlling interest in the Sidney Machine Tool Co., manufacturers of metalworking lathes. The firm was organized in 1904 as the Sidney Tool Co., and changed title in 1918.

Val Lee, president, retired. F. J. Fields, a vice president in the reorganization, continues as general manager. Directors include Sidney G. Rose, Philip and Ben Moskowitz, Marvin H. Rose, Joseph H. Hoodin, and Fred Weiland, all of Cincinnati.

Pacific States Completes Furnace

First of four 150-ton open-hearth furnaces is being completed by Pacific States Steel Corp. as part of a $6 million facilities expansion program. Scheduled for completion by the end of the year is a new furnace building and related structures.

Westinghouse Bags Big One

Westinghouse Electric Corp., Pittsburgh, received an order from Weirton Steel Co. for $840,000 worth of electrical equipment that will double the speed of a big strip mill.

The equipment includes new electric motors and controls for a 36-inch 4-stand tandem cold reduction strip mill at the steel company's plant in Weirton, W. Va.

All of the big motors will be built at the Westinghouse plant in East Pittsburgh, Pa. The control equipment and smaller motors will be manufactured at the company's Buffalo plant.

Cyclone To Get New Warehouse

A $200,000 office and warehouse will be constructed in Glendale, Calif., for occupancy by the Cyclone Fence Division of American Steel & Wire Co., Cleveland.

George W. Carter Co., Los Angeles, owner and builder of the property, made the announcement. The undertaking is the latest of Carter's lease-back deals. It calls for a 20-year lease with an option for ten additional years. Carter transactions are "one-control package" deals, under the terms of which Carter is the principal

from the signing of the first agreement to the ultimate completing of the deal.

Alcoa Dickers for Electricity

Aluminum Co. of America and the Canadian government are negotiating for waterpower rights in northern British Columbia. Alcoa and Alcoa of Canada are seeking franchises to assure power for proposed aluminum plants at Kitimai, B. C., and near Skagway, Alaska.

Niagara Mohawk Plans Big Plant

Niagara Mohawk Power Corp. is planning a $27 million steam-electric plant on the Hudson river at Albany, N. Y. Work is scheduled to begin shortly.

Ore Ships To Shift To Diesels

Pittsburgh Steamship Co. will convert two of its ore-carrying vessels from coal to oil at the end of the 1950 season.

Two 600-foot vessels, the Steamers *Eugene W. Pargny* and *Homer D. Williams,* are now powered by triple expansion steam engines, but they will be equipped with 3000-hp diesels in time for the opening of the 1951 Great Lakes shipping season, says Walter C. Hemingway, president of the U. S. Steel Corp.'s shipping subsidiary. Greater speed and power of the vessels will enable them to make more trips per season with no increase in operating costs.

United Chromium Moves

Detroit personnel of United Chromium Inc., New York, moved into new quarters. Their cream-colored, steel and masonry building with 17,000 sq ft of work space was designed to provide added facilities needed for carrying out the company's expanded activities in the plating and organic finishing fields.

Sales offices, research and analytical laboratories of the company's electroplating division and a pilot plant are all in the same building.

Fairchild To Sell Lithotypes

Selling of its Lithotype composing machine, designed to provide low-cost composition in regular printers' type for offset reproduction, is to be started by Fairchild Camera & Instrument Corp., Jamaica, L. I., N. Y., this quarter.

First machines from production lines will be available in the third or fourth quarter of this year. First service tests were begun in the third quarter of 1949 when the first of ten Lithotype machines was released for use by a typical potential user. After that, additional machines were put into use in other companies under various conditions typical of those in many industrial, business, educational and other organizations. By the end of the year sufficient favorable experience had been accumulated to justify release of the first production order.

Perrault To Make Plastic Pipe

Perrault Brothers Inc., Lami-Rock Division, will begin commercial production this year in Tulsa, Okla., of reinforced thermo-setting plastic pipe.

Perrault will eventually produce some 30,000 feet per day to sell at prices competitive with protected steel and cast iron pipe. H. D. Boggs of Lami-Rock Division says the new pipe has an expected life of 50 years, does not corrode and is light.

First applications are to be made in the oil fields for salt water, sour crude oil gathering and distribution lines.

Applications are also for water supply lines to drilling rigs, pipe lines in swamps and offshore piling. Other uses are contemplated for industrial installations, irrigation, water and gas mains and sewage.

Wide World

TEXAS TUNNEL: By the middle of next month the first of nine sections like this will be delivered. It is one of the sections for the Houston-Baytown vehicle tunnel to be built under the Houston ship channel. Its dimensions: 34 feet, 10 inches in diameter; 300 feet in length. Each of six sections will be 300 feet long; the others, 250 feet. Orange, Tex., plant of Consolidated Western is doing the work

Oil Mist: Cost Saver

Technique to lubricate machine bearings will cut oil use, add to equipment life, ASLE told

OIL mist lubrication that can cut oil consumption by as much as 90 per cent was described at the Detroit convention and show of the American Society of Lubrication Engineers.

E. R. Harris, Alemite Division, Stewart-Warner Corp., Chicago, says that this new idea in the science of machine bearing lubrication can increase bearing life from 400 to 7000 hours. The system is simple and compact, comprising a lubricator that atomizes oil through air pressure, delivering the resulting mist to a group of bearings on a machine. Bearings in this oily atmosphere are lubricated and ventilated by a constant film of fresh oil.

Clean Up—D. M. Cleaveland, Bendix Aviation Corp., South Bend, Ind., outlined his company's practice in reclaiming cutting oils, some lubricating oils and solvents. Contaminants fall into four classifications: Insoluble materials, volatile impurities, colloidal impurities and substances soluble in oil. The first three types are of major concern. Filtration is used for removal of contaminants falling in the first classification, distillation for those in the second, and filtration and chemical treatment for the third.

M. A. Hayden, Vickers Inc., Detroit, wants maintenance men to be better trained in hydraulics. An effective educational program would eliminate many of the service problems in connection with hydraulic systems for machine tools.

Too Many Cooks—E. M. Kipp, Aluminum Co. of America, criticizes the large number of presently available commercial lubricants on the basis that specific needs for relatively secondary corresponding variations in properties have not been established clearly. He says variations in operating conditions often may be of such magnitude as to throw the use of lubricants of a highly specific nature open to question on the basis of practical realities. He suggests the use of multifunctional lubricants merits careful consideration.

M. B. Roosa, Parker Rust Proof Co., Detroit, summarized the application of phosphate coating to ferrous surfaces, combined with well-engineered lubrication, as a proved method for reducing wear and galling on mating parts. The type of coating and degree of etch depend in large degree upon the cleaning method used prior to treatment.

West Europe Braces for Labor Trouble

British unions want more money. Communists expected to muddy the waters in France. German labor demands more voice in management

THE LABOR pot may come to a boil in Britain, France and Western Germany sometime this summer.

Since devaluation of the pound last September, the British cost of living has risen 6 per cent—not a great rise, but enough to chafe labor rank and file growing restive under a voluntary wage freeze policy that keeps rates at 1948 levels. The Trades Union Congress, a confederation of most of Britain's major unions, had accepted the government's freeze proposal. The government and TUC face a rebellion, notably from the Confederation of Shipbuilding & Engineering Unions and the National Union of Railwaymen.

The labor situation in France is now almost normal, but watch for another flareup this summer.

Negotiations between employers' associations and unions have broken down in Western Germany. Government officials will try to find some solution on wages and other aspects of labor-management relations. If they fail, strikes are possible this summer.

U.K. Wage Freeze Threatened

Some 5 million Britons are openly campaigning for more money and threaten to break the government's wage-price line.

The shipbuilding and engineering workers, numbering 2,750,000, want $2.80 more a week. A strike ballot has been ordered for this spring.

The railwaymen want the state-owned railroads to boost the minimum basic wage from $12.96 a week to $14. The railroaders don't threaten an outright strike. They'll just stop working on weekends. The slowdown system was tried last summer and brought chaos to passenger and freight schedules.

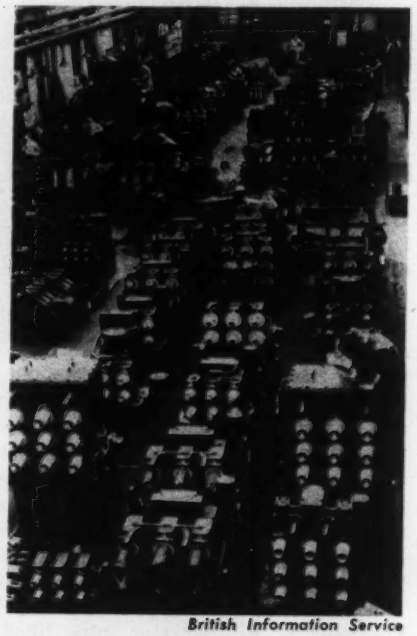
Nearly 2 million other workers, including teachers, civil servants and textile mill hands have filed demands for more money.

Reds Rile Up French Workers

If there are no economic issues to cause walkouts in France this summer, count on the Communists to try to concoct some.

The Reds may have trouble because the basic problem, inflation, is subsiding. The franc is recovering. At the end of March, 356 francs bought one dollar; 391 francs were needed at the beginning of 1950. The price of gold in France dropped 18 per cent from Jan. 1 to Mar. 31.

France is proposing a law to prohibit "all activities tending to restrain or suppress competition." The number of trade agreements now in force in France is reportedly 3500. Under the government's proposal, a special court of seven judges would examine complaints about cartels. Failure to obey the court's orders would result in heavy fines.



British Information Service

BIG SWITCH: This kind of electrical switchgear in a workshop of the Reyrolles factory at Hebburn, Durham, England, will be moved to the 1950 British Industries Fair at Earls Court and Olympia, London, and Castle Bromwich, Birmingham, May 8-19

Wide World

COPPER DRAWN THROUGH BANK: Danish workmen draw copper tubing in a factory that was supplied with machinery, tools and trucks bought with a $40 million World Bank Loan made to the Danish government

Ruhr Labor Talks Deadlocked

Labor negotiations in Western Germany are at an impasse because unions want all the larger companies to agree that half their directors be elected from a union slate.

Many employers will accept this compromise: That half the directors be elected from the rank and file within the company. The unions insist that their slate be composed of anyone they please.

Cartel feelers are getting stronger. Early in April a meeting of Belgian, French and Luxemburg steel people took place in Luxemburg at the invitation of Arbed, the Luxemburg steel combine. Reason for the meeting was that German steel jobbers are underselling the French and Belgians in Switzerland, an area for which the French, Belgians and Luxemburgers have a gentlemen's agreement on prices.

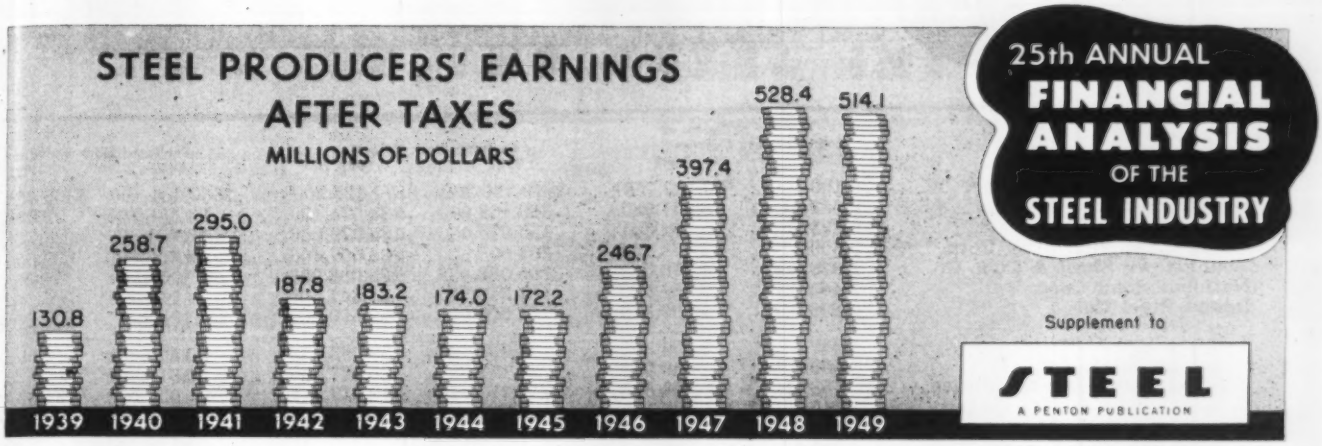
Aussie Immigration Soars

Immigrants are streaming into Australia at the rate of 500 a day, a rate equal to that at the height of America's migratory wave.

Recruiting teams in England and continental Europe seek skilled carpenters, bricklayers, plumbers and similar craftsmen to ease the nation's critical labor shortage. Australia's population passed the 8 million mark in November, 1949. The present migratory wave—planned, inspired and financed by the government—is designed to bolster and stabilize the economy of the land down under.

A new Australian car, the Hartnett, will be ready for production before the end of 1950.

Many of the parts for the auto will be made in Britain, and at the start Australian operations will largely be confined to assembly. Eventually, though, the whole car will be built in Australia. It will be a small, low-price model with an air-cooled engine and front wheel drive. Wheelbase will be 78¾ inches; top speed will be 53.5 miles per hour; expected gasoline consumption is 60 miles per gallon.



25th ANNUAL
FINANCIAL ANALYSIS
OF THE
STEEL INDUSTRY

Supplement to
STEEL
A PENTON PUBLICATION
April 24, 1950

Operating Economies Aid Steel Earnings

POSTWAR upward trend of steel industry earnings was reversed in 1949 but the year was still better for the industry than any in the last decade except 1948.

STEEL's accompanying compilation of financial reports from 29 companies representing slightly more than 92 per cent of the nation's ingot capacity shows their aggregate net earnings in 1949 were $514,133,177, compared with $528,357,192 in 1948. As indicated in the chart at the top of this page the 1949 net earnings are exceeded only by those of 1948.

The 1949 net earnings represented $6.54 per share of common stock after allowance for preferred stock dividend requirements. In 1948 the common earned $6.84.

Recession, Strike Cut Earnings

The decline in earnings resulted largely from the 9 per cent dent a midyear business recession and a late-in-the-year steelworkers' strike put in net sales and revenues, the aggregate of sales and revenues falling from $7,940,761,467 in 1948 to $7,217,937,986 in 1949. Expense attributable to the strike also was partly responsible for the decline in earnings. Only six of the 29 companies ran counter to the 1949 pattern and had sales totals exceeding those of 1948.

Measured by net earnings per dollar of sales, 1949 was, however, the best year the industry has experienced since 1940. Out of each 1949 sales dollar 7.12 cents remained as net profit, compared with 7.48 cents in 1940 and 6.65 cents in 1949. Increase in its net profit per dollar of sales in 1949 despite a decline in sales reflects benefits accruing from: 1. New equipment installed in its huge postwar program of plant rehabilitation; 2. emphasis on cost-cutting; and 3. reduced need for work at overtime pay.

Measured, however, by earnings per dollar of capitalization, 1949 was not as favorable as 1948. In 1949 the steel industry had net earnings of 9.86 cents for each dollar of capitalization, whereas in 1948 it earned 10.74 cents. The 1949 figure, nevertheless, has been exceeded since 1929 only by the 1948 rate. The decline in earnings per dollar of capitalization results largely from the increase of total capitalization from $5,090,735,910 in 1948 to $5,422,389,955 in 1949. All but six companies showed increases in capitalization. Most of the rise results from the increase in earned surplus (or earnings retained for use in the business). Spurring companies to increase the size of their earned surplus are the continued high levels of production and their attendant requirements of a large working capital and continuation of high costs of replacements. Of the 29 companies 24 increased their surplus, while five reported a decrease.

Two Companies Have Losses

The easing off in the steel industry's business in 1949 was accompanied by net deficits for two producers, whereas only one of those had a net deficit in 1948. Of the other 27 companies 19 reported declines in net earnings, while eight ran counter and showed increases.

Total net earnings went down less percentagewise than steel ingot production and as a result net income per ton of ingots rose from $6.23 per ton in 1948 to $7.01 in 1949. Net income per ton of ingot capacity, however, dropped from $6.03 in 1948 to $5.83 in 1949 because of the decline in net earnings and a rise in capacity. Even though capacity went up the capitalization per ton of ingot capacity rose from $58.79 in 1948 to $61.30 in 1949 because of the substantial increase in capitalization.

Lowered business and earnings level in 1949 reduced the federal income tax total for the 29 companies from $378,029,602 in 1948 to $368,407,411 in 1949.

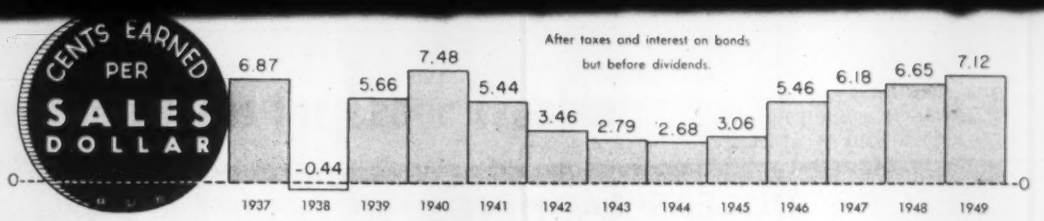
Total charges for depreciation and depletion dropped from $292,237,693 in 1948 to $272,037,348 in 1949. One company accounts for most of the reduction, it having slashed its accelerated depreciation charge because of a lowered rate of plant operation.

Employment Rolls Decline

The sales decline and increase in plant and equipment efficiency cut the need for employees from 785,299 in 1948 to 746,343 in 1949. As a result of these two factors and a steelworkers' strike total payrolls in the 29 companies slipped from $2,743,385,466 in 1948 to $2,487,856,922 in 1949.

Strengthened financial position and completion of the bulk of postwar plant expansion and improvement programs acted as a brake on increase of funded debt. While total funded debt rose from $640,279,239 in 1948 to $667,075,039 in 1949, most of the companies either had reduced it or had none. Two companies account for most of the increase.

Current assets and current liabilities declined but as the percentage drop of the latter was greater the ratio of current assets to current liabilities edged up from 2.44 to 1 in 1948 to 2.78 to 1 in 1949. This pushed up the working capital of the 29 companies from $1,777,083,442 in 1948 to $1,923,644,509 in 1949. Total assets moved up from $6,582,367,598 in 1948 to $6,775,681,344 in 1949.



	Number of Shares of Common Stock Outstanding 1949	1948	Common Stock Valuation 1949	1948	Preferred Stock Valuation 1949	1948	Book Value Per Share of Common Stock 1949	1948
United States Steel Corp.	26,109,756[4]	26,109,756[4]	$870,325,200	$870,325,200	$360,281,100	$360,281,100	$59.65	$56.41
Bethlehem Steel Corp.	9,582,942	8,954,982	303,459,830	283,574,430	93,388,700	93,388,700	66.87	61.62
Republic Steel Corp.	5,893,103	5,882,604	135,979,066	135,979,066	28,204,300	28,214,300	55.44	50.99
Jones & Laughlin Steel Corp.	2,600,327	2,476,502	103,936,900	96,507,400	29,356,800	29,356,800	90.26	89.57
Youngstown Sheet & Tube Co.	1,675,008	1,675,008	105,088,053	105,088,053	None	None	144.89	131.92
National Steel Corp.	2,453,950	2,453,900	61,348,750	61,347,500	None	None	103.84	93.24
Inland Steel Co.	4,899,315	4,899,315	62,500,000	62,500,000	None	None	37.86	35.76
Armco Steel Corp.[11]	3,909,352	3,909,361	39,093,522	39,093,612	20,000,000	19,993,000	45.46	42.62
Wheeling Steel Corp.	569,559	569,559	28,477,950	28,477,950	36,316,600	36,316,600	142.09	135.42
Crucible Steel Co. of America	488,680	488,683	12,217,015	12,217,077	31,057,500	31,357,600	76.41	75.82
Colorado Fuel & Iron Corp.[17]	1,145,355	1,127,185	5,726,775	5,635,925	9,554,333	10,028,067	49.01	42.65
Pittsburgh Steel Co.	508,917	508,917	4,862,190	4,862,190	16,438,200	16,438,200	50.17	50.21
Lukens Steel Co.[31]	317,976	317,976	3,179,760	3,179,760	None	None	61.64	55.12
Granite City Steel Co.	397,787	382,488	8,823,031	8,483,821	None	None	49.79	45.79
Sharon Steel Corp.	617,242	617,242	6,232,810	6,232,810	None	None	65.97	62.58
Alan Wood Steel Co.	507,889	483,767	5,335,404[14]	4,837,670	6,886,300	7,036,300	28.28	25.64
Midvale Co.	600,000	600,000	10,574,621	10,574,621	None	None	26.31	29.56
Allegheny Ludlum Steel Corp.	1,288,831	1,288,831	8,055,194	8,055,194	10,738,300	10,738,300	32.53	33.62
Continental Steel Corp.	501,364	501,365	7,018,845	7,018,866	None	None	29.87	30.10
Laclede Steel Co.	206,250	206,250	4,125,000	4,125,000	None	None	51.18	43.00
Keystone Steel & Wire Co.	1,875,000	1,875,000	2,604,167	2,604,167	None	None	8.84	7.13
Follansbee Steel Corp.[35]	442,228	442,228	4,402,287	4,402,287	None	None	29.71	34.30
A. M. Byers Co.[24]	264,635	264,635	2,646,350	2,646,350	5,133,900	5,317,100	59.50	55.90
Copperweld Steel Co.	514,864	514,864	2,574,320	2,574,320	1,216,000	1,444,000	27.98	26.94
Northwestern Steel & Wire Co.[16]	817,825	817,825	4,089,125	4,089,125	None	None	8.27	6.77
Rotary Electric Steel Co.	193,676	192,939	1,936,760	1,929,390	None	None	36.62	31.52
Carpenter Steel Co.[17]	360,000	360,000	1,800,000	1,800,000	None	None	42.28	38.00
Portsmouth Steel Corp.	1,262,275	1,273,200	1,262,275[33]	1,273,200[34]	None	None	17.18	15.10
Barium Steel Corp.	2,183,769	1,978,831	2,183,769	1,978,831	None	None	6.09	6.34
Total (or average)	72,187,875	71,173,213	$1,809,858,969	$1,781,413,815	$648,572,033	$649,910,067		

	Preferred Dividend Requirements 1949	1948	Net Earnings Per Common Share 1949	1948	Dividends Per Share on Preferred 1949	1948	Dividends Per Share on Common 1949	1948	Average Number Employed 1949	1948
United States Steel Corp.	$25,219,677	$25,219,677	$5.39[4]	$4.00[4]	$7.00	$7.00	$2.15[4]	$2.00[4]	291,163	296,78
Bethlehem Steel Corp.	6,537,209	6,537,209	9.68	9.36	7.00	7.00	2.40	2.40	133,636	146,98
Republic Steel Corp.	1,692,558	1,692,858	7.54	7.61	6.00	6.00	3.00	2.25[5]	66,083	70,52
Jones & Laughlin Steel Corp.	1,467,840	1,467,840	7.50	12.01	5.00	5.00	2.60	2.15	41,516	43,47
Youngstown Sheet & Tube Co.	None	None	18.97[6]	21.32[6]	None	None	6.00	5.00	25,140	26,65
National Steel Corp.	None	None	16.02	16.35	None	None	5.50	5.00	28,043	28,29
Inland Steel Co.	None	None	5.11	7.88	None	None	3.00	3.00	23,574	23,59
Armco Steel Corp.[11]	899,787	899,708	7.68[12]	8.00[12]	4.50	4.50	2.50	2.00	26,539	30,49
Wheeling Steel Corp.	1,815,830	1,815,830	10.68	23.24	5.00	5.00	4.00	2.75	14,849	15,17
Crucible Steel Co. of America	1,556,855	1,567,855	0.42*	4.15	4.37½	5.00	None	None	14,211	15,58
Colorado Fuel & Iron Corp.[17]	490,954	502,785	8.46	5.04	1.00	1.00	2.00	1.25	14,828	15,22
Pittsburgh Steel Co.	863,994	863,994	0.04*	9.08	5.50[13]	5.50[13]	None	None	9,067	9,79
Lukens Steel Co.[31]	None	None	6.07	6.52	None	None	1.05	1.50	4,647	5,24
Granite City Steel Co.	None	None	7.44	8.54	None	None	2.00[9]	2.25	2,872	2,57
Sharon Steel Corp.	None	None	5.39	14.96	None	None	2.00	2.50	9,082	9,76
Alan Wood Steel Co.	346,190	353,084	3.76	7.78	5.00	5.00	[13]	1.00	3,093	3,29
Midvale Co.	None	None	1.82*	2.78*	None	None	None	1.75	2,050	2,59
Allegheny Ludlum Steel Corp.	483,242	319,754	1.15	5.05	4.50	3.00	2.00	2.00	11,493	12,64
Continental Steel Corp.	None	None	1.27	3.24	None	None	1.50	1.75	2,559	2,55
Laclede Steel Co.	None	None	13.18	8.57	None	None	5.00	3.50	2,444	2,47
Keystone Steel & Wire Co.	None	None	2.71	2.22	None	None	1.00	1.00	2,146	2,16
Follansbee Steel Corp.[35]	None	None	0.20*	5.29	None	None	1.00	3.00	2,663	3,45
A. M. Byers Co.[24]	362,579	374,332	5.15	7.39	7.00	7.00	1.50	0.75	2,983	3,07
Copperweld Steel Co.	67,058	76,952	3.24	9.54	2.50	2.50	2.20	2.70	2,429	3,05
Northwestern Steel & Wire Co.[16]	None	None	2.74	2.05	None	None	1.25	1.00	1,959	1,80
Rotary Electric Steel Co.	None	None	6.65	12.94	None	None	1.50	2.00[7]	580	66
Carpenter Steel Co.[17]	None	None	6.27	4.32	None	None	2.00	2.50	2,569	2,84
Portsmouth Steel Corp.	None	None	3.87	3.54	None	None	1.50	1.00	4,125	4,48
Barium Steel Corp.	None	None	0.33	1.32	None	None	[21]	None	NA	NA
Total (or average)	$41,803,773	$41,691,878	$6.54	$6.84					746,343	785,29

Boldface type is used under those columns in which figures from all 29 companies were not available. NA=Not available.

* Deficit.

[1] Excluding amount maturing within one year.

[2] After income taxes.

[3] Including funded debt due within one year.

[4] Based on shares outstanding after 3 for 1 split May 12, 1949.

[5] Includes accelerated depreciation of $22,045,743 in 1949 and $55,335,444 in 1948.

[6] Before appropriating $4½ million in 1949 and $6 million in 1948 for increased construction and replacement costs and contingencies.

[7] Includes $900,000 for 1949 and $800,000 for 1948 for surplus reserve for inventory price declines.

[8] After appropriating $100,000 for 1949 and $650,000 for 1948 for inventory price declines.

[9] Plus one share of common stock for each 25 shares held; paid Dec. 23, 1949.

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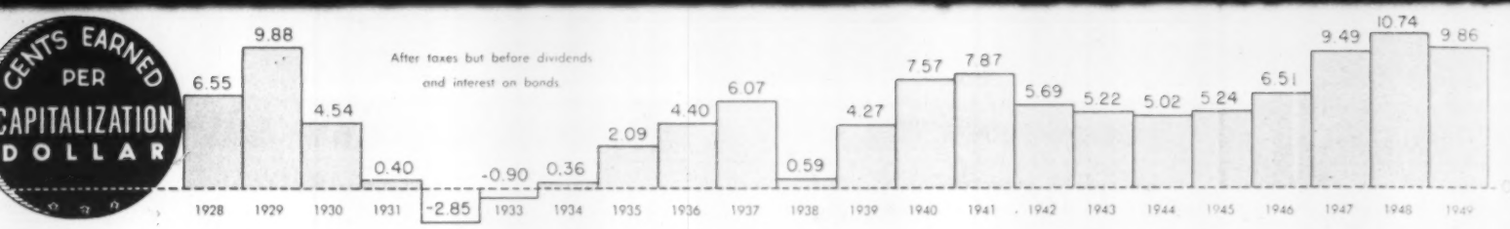


ue Per Share mon Stock 1948	Number of Common Stockholders 1949	1948	Number of Preferred Stockholders 1949	1948	Funded Debt[1] 1949	1948	Surplus 1949	1948	Total Capitalization 1949	1948	
$56.41	180,274	166,823	76,085	76,284	$65,944,114	$71,554,196	$687,006,870	$602,453,693	$1,983,557,284	$1,904,614,189	
61.62	74,876	64,127	24,213	24,537	169,564,000	121,814,000	337,348,399	268,208,157	903,760,929	766,985,287	
50.99	55,346	54,000	8,110	8,306	58,966,653	69,489,178	190,743,325	163,970,323	413,893,344	397,652,867	
89.57	22,847	22,129	6,568	6,507	60,461,497	60,000,000	130,771,940	125,303,616	324,527,137	311,167,816	
131.92	12,551	12,243	None	None	30,000,000	30,000,000	116,701,638	99,474,676	251,789,691	234,562,729	
93.24	NA	NA	None	None	40,000,000	40,000,000	193,480,944	167,457,222	294,829,694	268,804,722	
35.76	14,001	13,119	None	None	71,250,000	73,250,000	123,013,206	112,697,441	256,763,206	248,447,441	
42.62	39,824	39,009	5,500	5,572	64,290,000	69,160,000	138,514,143	127,431,754	261,897,665	255,678,366	
135.42	5,008	4,800	4,508	4,475	40,950,000	42,103,000	52,451,413	48,649,214	158,195,963	155,546,761	
75.82	3,390	3,200	7,043	6,800	23,255,000	24,140,000	25,120,762	24,836,603	91,650,277	92,551,280	
42.65	5,979	5,939	5,277	5,652	11,687,500	8,800,000	50,439,830	42,478,406	77,408,438	66,942,398	
50.21	1,454	1,527	2,561	2,542	5,276,000	5,660,000	26,419,227	26,519,999	52,995,617	53,480,389	
55.12	1,602	1,600	None	None	3,509,000	916,667	16,419,117	14,347,947	23,107,877	18,444,371	
45.79	2,201	2,049	None	None	1,243,292	2,882,525	10,083,709	8,229,786	21,050,032[2]	20,396,133[2]	
62.58	4,708	4,546	None	None	9,200,000	9,900,000	34,484,252	32,392,770	49,917,062	48,525,580	
25.64	793	747	654	625	6,300,000	6,300,000	9,026,310	7,564,896	27,548,014	25,738,866	
29.56	NA	NA	None	None	None	None	5,209,518	7,159,833	15,784,139	17,734,454	
33.62	13,123	13,247	2,526	2,598	None	None	33,865,906	35,276,183	52,659,400	54,069,677	
30.10	2,640	2,644	None	None	None	None	7,959,404	8,074,734	14,978,249	15,093,660	
43.00	1,139	1,120	None	None	2,177,983	2,309,673	6,430,933	4,743,831	12,733,916	11,178,504	
7.13	3,207	3,067	None	None	None	2,000,000	13,978,231	10,769,050	16,582,398	15,373,217	
34.30	2,647	2,376	None	None	None	None	8,736,193	10,764,305	13,138,480	15,166,592	
55.90	2,276	2,377	1,474	1,545	None	None	13,099,858	12,147,624	20,880,108	20,111,074	
26.94	3,103	2,880	503	586	None	None	11,830,017	11,295,974	15,620,337	15,314,294	
6.77	940	958	None	None	None	None	2,672,051	1,450,393	6,761,176	5,539,518	
31.52	882	739	None	None	3,000,000	None	5,156,530	4,151,847	10,093,290	6,081,237	
38.00	2,650	2,600	None	None	None	None	13,420,096	11,881,144	15,220,096	13,681,144	
15.10	8,842	7,936	None	None	None	None	20,422,673	17,948,475	21,750,173	19,300,975	
6.34	11,000	10,000	None	None	None	None	11,112,194	10,573,589	13,295,963	12,552,420	
	477,303	**445,802**	145,022	146,029	$667,075,039	$610,279,239	$2,295,918,689	$2,018,253,488	$5,422,389,955	$5,090,735,910	$61.3

verage r Employed 1948	Total Payrolls 1949	1948	Rated Ingot Capacity, Net Tons 1949	1948	Ingot Production, Net Tons 1949	1948	Steel Operating Rate, Per Cent 1949	1948	Net Income Per Ton Ingots Produced 1949	1948	Net Income Per Ton Ingot Capacity 1949	1948
296,785	$925,123,554	$1,029,250,393	32,000,000	31,300,000	25,807,000	29,292,000	82.50	93.80	$6.43	$4.42	$5.18	$4.14
146,988	454,833,447	494,537,405	14,200,000	13,800,000	12,596,949	13,411,492	88.71	97.18	7.88	6.71	6.99	6.55
70,521	207,255,939	245,554,588	8,600,000	8,600,000	6,804,020	8,324,172	79.12	96.79	6.78	5.58	5.37	5.40
43,474	143,902,972	151,307,924	4,816,500	4,816,500	4,170,432	4,633,558	86.59	96.20	5.03	6.71	4.35	6.48
26,659	84,601,000	99,751,000	4,082,000	4,002,000	3,478,259	3,966,099	85.21	99.10	9.14[3]	9.09[3]	7.78	8.92
28,299	107,843,848	110,709,056	4,200,000	4,050,000	NA	NA	NA	NA	NA	NA	9.36	9.91
23,594	88,011,301	91,429,503	3,400,000	3,400,000	3,019,655	3,533,374	88.81	103.92	8.28	10.93	7.36	11.35
30,497	96,404,964	105,412,258	3,793,000	3,563,000	3,131,020	3,332,261	82.55	93.52	9.87	9.61	8.15	8.99
15,178	56,378,771	56,858,624	1,536,000	1,409,000	1,227,600	1,303,424	79.92	92.51	6.43	11.55	5.14	10.68
15,589	42,293,525	55,187,000	1,112,984	1,277,133	NA	NA	NA	NA	NA	NA	1.22	2.82
15,226	51,168,043	48,698,498	1,472,000	1,472,000	1,446,693	1,395,717	98.28	94.82	7.04	4.43	6.92	4.20
9,792	32,306,213	37,264,985	1,072,000	1,072,000	717,253	976,218	66.91	91.07	1.18	5.62	0.79	5.12
5,248	16,597,168	18,033,124	624,000	624,000	NA	647,876	NA	103.83	NA	3.20	3.09	3.32
2,570	9,956,596	8,739,982	620,000	620,000	531,824	493,720	85.78	79.63	5.56	6.62	4.77	5.27
9,760	28,391,230	35,376,776	1,672,000	1,672,000	1,001,625	1,298,383	59.91	77.65	3.32	7.11	1.99	5.52
3,292	10,035,242	10,889,674	550,000	550,000	381,710	530,691	69.40	96.49	5.91	7.76	4.10	7.48
2,593	7,347,839	5,296,406	449,950	517,322	67,647	64,962	15.03	12.56	16.18[4]	25.64[4]	2.43[4]	3.22
12,645	39,113,813	45,519,013	832,360	496,360	362,813	462,306	57.80	93.14	5.42	14.78	2.36	13.77
2,554	7,451,134	8,140,217	364,000	364,000	239,736	317,927	65.86	87.34	2.66	5.11	1.75	4.47
2,474	7,948,014	8,139,117	326,025	326,025	283,488	278,170	86.95	85.32	9.59	6.36	8.34	5.42
2,167	9,445,747	8,795,495	302,400	302,400	308,131	298,882	101.89	98.84	16.50	13.94	16.81	13.78
3,455	8,350,159	10,131,623	141,120	141,120	NA	NA	NA	NA	NA	NA	NA	NA
3,075	9,659,598	10,004,520	[25]	[25]	[25]	[25]	[25]	[25]	[25]	[25]	[25]	[25]
3,057	9,441,138	13,597,200	554,400	554,400	NA	NA	NA	NA	NA	NA	NA	NA
1,808	7,556,470	6,670,390	321,000	321,000	288,814	287,670	89.97	89.62	7.77	5.81	6.99	5.21
668	2,699,003	3,302,727	420,000	340,000	247,350	247,658	58.89	94.50	5.20	10.08	3.06	7.31
2,843	11,095,690	9,494,668	81,360	81,360	55,107	51,268	67.73	68.47[19]	40.99	30.31	27.76	20.75
4,488	12,644,504	15,293,300	660,000	660,000	511,647	647,816	77.52	98.15	9.55	6.96	7.40	6.84
NA	NA	NA	406,000[22]	343,000	186,485	290,560	45.93	84.71	[26]	[26]	[26]	[26]
785,299	**$2,487,856,922**	**$2,743,385,466**	**88,609,099**	**86,674,620**	**66,865,258**	**76,086,204**	**81.57**	**94.34**	**$7.01**	**$6.23**	**$5.83**	**$6.02**

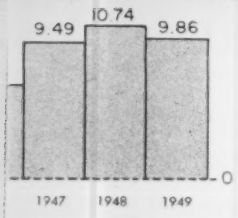
r cent stock dividend.
eign subsidiaries except Canadian were excluded nsolidation.
utstanding stock averaging 3,907,161 shares in 591,526 shares in 1948.
prior preferred; payment on class A preferred 9, $5.00 in 1948; no payments either year on class

[14] Includes $256,514 in common stock and scrip issuable in 1950 for stock dividends.
[15] Two 5 per cent stock dividends declared.
[16] Fiscal year ended July 31.
[17] Fiscal year ended June 30.
[18] Includes $250,000 from reserve for decline in scrap prices.
[19] Calculated on 74,880-ton ingot capacity, as capacity was expanded after June 30, 1948.

Compiled by

STEEL
A PENTON PUBLICATION

April 24, 1950



THIS SPECIAL REPORT is compiled from data from 29 producers representing slightly more than 92 per cent of the steelmaking capacity in the United States

Total Capitalization 1949	Total Capitalization 1948	Capitalization Per Ton Ingot Capacity 1949	Capitalization Per Ton Ingot Capacity 1948	Provision for Depreciation, Depletion 1949	Provision for Depreciation, Depletion 1948	Total Income Before Dividends and Interest on Bonds[2] 1949	Total Income Before Dividends and Interest on Bonds[2] 1948	Total Income—Per Cent of Capitalization 1949	Total Income—Per Cent of Capitalization 1948
)83,557,284	$1,904,614,189	$61.99	$60.85	$119,661,652[5]	$145,986,681[5]	$168,206,145	$132,022,190	8.48	6.93
)03,760,929	766,985,287	63.65	55.58	33,019,014	30,222,602	104,196,206	93,864,061	11.53	12.24
13,893,344	397,652,867	48.13	46.24	18,496,410[23]	23,016,740[25]	48,069,302	48,596,406	11.61	12.22
24,527,137	311,167,816	67.38	64.60	16,684,005	16,131,249	22,611,245	32,872,451	6.97	10.56
251,789,691	234,562,729	61.68	58.61	9,980,526	11,511,049	32,602,010	36,536,732	12.95	15.58
294,829,694	268,804,722	70.20	66.37	25,021,857[23]	21,506,270[23]	40,568,413	41,378,649	13.76	15.39
256,763,206	248,447,444	75.52	73.07	9,847,447	8,285,338	26,987,306	40,246,673	10.51	16.20
261,897,665	255,678,366	69.05	71.76	9,591,016	8,161,074	32,940,495	33,855,670	12.58	13.24
158,195,963	155,546,764	102.99	110.40	6,229,445[30]	5,390,827[30]	9,274,109	15,788,576	5.86	10.15
91,650,277	92,551,280	82.35	72.47	2,867,842	2,477,594	2,141,873	4,395,346	2.34	4.75
77,408,438	66,942,398	52.59	45.48	3,165,193	3,204,745	10,535,188	6,508,776	13.61	9.72
52,995,617	53,480,389	49.44	49.89	2,141,211	1,924,922	1,097,430	5,798,587	2.07	10.84
23,107,877	18,444,374	37.03	29.56	1,440,877[32]	1,386,477[32]	2,078,511	2,120,114	8.99	11.49
21,050,032[7]	20,396,133[7]	33.95	32.90	1,078,815	1,010,998	3,070,136	3,394,533	14.58	16.64
49,917,062	48,525,580	29.85	29.02	2,247,580	1,965,726	3,615,201	9,468,872	7.24	19.51
27,548,014	25,738,866	50.09	46.80	1,250,147	1,228,884	2,570,840	4,196,944	9.33	16.31
15,784,139	17,734,454	35.08	34.28	398,000	520,000	1,094,387*	1,665,718*	6.93*	9.39*
52,659,400	54,069,677	63.27	108.93	2,216,561	2,009,786	1,967,324	6,833,384	3.74	12.64
14,978,249	15,093,600	41.15	41.47	541,498	493,501	636,716	1,625,150	4.25	10.77
12,733,916	11,178,504	39.06	34.29	624,765	568,901	2,788,928	1,842,082	21.90	16.48
16,582,398	15,373,217	54.84	50.84	466,554	420,052	5,084,181	4,214,425	30.66	27.41
13,138,480	15,166,592	93.10	107.47	683,947	624,118	90,409*	2,339,996	0.00	15.43
20,880,108	20,111,074	[25]	[25]	906,838[26]	916,817[26]	1,724,223	2,331,034	8.26	11.59
15,620,337	15,314,294	[27]	[27]	586,092	795,591	1,737,506	5,184,764	11.12	33.86
6,761,176	5,539,518	21.06	17.26	225,770	197,522	2,243,939	1,680,477	33.19	30.34
10,093,290	6,081,237	24.03	17.89	296,711	167,074	1,287,063	2,524,479	12.75	41.51
15,220,096	13,681,144	187.07	168.16	375,166	328,936	2,258,952[15]	1,553,783	14.84	11.36
21,750,173	19,300,975	32.95	29.24	1,292,161	1,268,183	4,885,424	4,511,550	22.46	23.37
13,295,963	12,552,420	[20]	[20]	700,248	516,036	711,452	2,615,269	5.35	20.83
22,389,955	$5,090,735,910	**$61.30**	**$58.79**	$272,037,348	$292,237,693	$534,705,322	$546,635,255	9.86	10.74

Net Income Per Ton Ingots Produced 1949	Net Income Per Ton Ingots Produced 1948	Net Income Per Ton Ingot Capacity 1949	Net Income Per Ton Ingot Capacity 1948	Federal Income Taxes 1949	Federal Income Taxes 1948	Total Assets 1949	Total Assets 1948	Current Assets 1949	Current Assets 1948	
$6.43	$4.42	$5.18	$4.14	$126,000,000	$109,000,000	$2,556,365,712	$2,534,971,836	$939,111,579	$974,361,251	$
7.88	6.74	6.99	6.55	66,500,000	57,225,000	1,155,467,610	1,029,000,177	596,653,036	505,596,791	
6.78	5.58	5.37	5.40	35,000,000	34,000,000	496,092,781	489,086,371	222,158,046	227,082,058	
5.03	6.74	4.35	6.48	13,150,000	18,950,000	381,098,127	379,117,410	147,139,992	170,522,706	
9.14[6]	9.00[6]	7.78[6]	8.92[6]	19,894,000	25,400,000	326,977,993	311,677,377	213,002,502	202,688,266	
NA	NA	9.36	9.91	37,400,000	33,300,000	360,479,057	329,884,289	168,373,351	139,008,084	
8.28	10.93	7.36	11.35	15,935,000	23,221,000	300,667,729	292,821,723	151,287,709	158,638,518	
9.87	9.61	8.15	8.99	19,315,315	20,072,015	314,745,021	316,203,962	155,244,414	168,448,951	
6.43	11.55	5.14	10.68	5,819,000	9,459,562	173,271,660	171,695,218	63,651,900	70,298,872	
NA	NA	1.22	2.82	351,827	2,748,021	104,221,987	112,060,795	41,361,337	49,960,614	
7.04	4.43	6.92	4.20	6,059,200	3,659,100	97,131,281	85,691,111	42,350,023	35,961,933	
1.18	5.62	0.79	5.12	624,000	4,350,000	63,723,373	70,532,545	29,510,346	37,658,005	
NA	3.20	3.09	3.32	1,640,330	1,675,000	28,414,852	29,454,074	16,697,672	18,627,058	
5.56	6.62	4.77	5.27	1,890,000	2,370,000	29,690,036	27,089,395	15,064,088	13,255,046	
3.32	7.11	1.99	5.52	1,650,000	5,811,000	61,883,294	67,948,117	36,358,974	44,197,032	
5.91	7.76	4.10	7.48	1,480,000	2,842,000	32,727,600	32,782,558	10,002,040	12,964,388	
16.18*	25.64*	2.43*	3.22*	None	None	17,090,359	20,521,125	10,882,494	13,863,127	
5.42	14.78	2.36	13.77	1,200,000	4,601,358	67,899,858	68,422,073	32,908,076	42,497,279	
2.66	5.11	1.75	4.47	785,000	1,200,000	17,352,188	18,613,872	8,961,840	10,294,007	
9.59	6.36	8.34	5.42	1,815,000	1,165,000	15,356,772	15,207,422	8,382,568	8,788,466	
16.50	13.94	16.81	13.78	2,600,053	2,060,598	20,060,566	21,815,621	8,633,383	11,569,164	
NA	NA	NA	NA	None	1,600,700	17,455,736	22,751,173	11,120,437	13,462,949	
[23]	[23]	[23]	[23]	1,200,000	1,730,000	23,868,141	25,062,181	9,935,067	11,965,661	
NA	NA	NA	NA	900,000	3,316,180	18,975,748	23,741,758	11,867,454	16,617,911	
7.77	5.84	6.99	5.24	1,195,000	1,180,000	9,927,159	8,785,511	5,949,815	5,392,686	
5.20	10.08	3.06	7.34	955,000	1,500,000	11,712,572	7,398,795	4,616,689	3,661,564	
40.99	30.31	27.76	20.75[12]	1,227,224	944,892	18,555,721	17,605,979	12,685,296	11,982,408	
9.55	6.96	7.40	6.84	3,012,000	2,600,000	28,506,815	27,272,452	19,277,702	17,194,942	
[20]	[20]	[20]	[20]	809,462	2,048,176	25,961,596	25,152,678	10,356,721	13,820,754	
$7.01	**$6.23**	**$5.83**	**$6.03**	$368,407,411	$378,029,602	$6,775,681,344	$6,582,367,598	$3,003,544,551	$3,010,380,491	$1,0

[20] Not applicable to company's operations.
[23] Ten per cent stock dividend.
[25] Does not include 450,000 net tons of capacity of Phoenix Iron & Steel Co. acquired in fourth quarter of 1949 and put into operation in February, 1950.
[26] Includes accelerated depreciation of $11,850,000 in 1949 and $10,500,000 in 1948.
[24] Fiscal year ended Sept. 30.
[25] Not applicable, company's principal business is wrought iron.
[26] Includes accelerated depreciation of $116,183 in 1949 and $161,947 in 1948.
[27] Comparisons would be misleading inasmuch as company's operations include a wire and cable division with no steel ingot capacity.
[28] Includes accelerated depreciation of $3 million in 1949 and $7 million in 1948.

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Financial Analysis

OF THE STEEL INDUSTRY FOR 1949

ome—Per pitalization 1948	Net Sales 1949	Net Sales 1948	Net Profit—Per Cent of Net Sales 1949	Net Profit—Per Cent of Net Sales 1948	Net Income Before Dividends 1949	Net Income Before Dividends 1948	
6.93	$2,301,685,689	$2,481,508,535	7.21	5.22	$165,908,829	$129,627,845	United States Steel Corp.
12.24	1,271,040,076	1,315,188,536	7.81	6.87	99,283,539	90,347,560	Bethlehem Steel Corp.
12.22	651,952,835	766,400,960	7.08	6.06	46,142,323	46,438,382	Republic Steel Corp.
10.56	386,046,149	446,057,301	5.43	7.00	20,961,245	31,222,451	Jones & Laughlin Steel Corp.
15.58	338,344,004	381,742,264	9.39	9.35	31,777,010[6]	35,711,732[6]	Youngstown Sheet & Tube Co.
15.39	424,892,845	436,522,051	9.25	9.19	39,311,269	40,121,506	National Steel Corp.
16.20	347,640,710	394,716,908	7.20	9.78	25,013,707	38,606,898	Inland Steel Co.
13.24	341,350,147	382,563,811	9.06	8.37	30,918,202	32,030,712	[11]Armco Steel Corp.
10.15	144,382,844	155,960,457	5.47	9.65	7,896,265	15,050,046	Wheeling Steel Corp.
4.75	100,336,614	131,360,030	1.35	2.74	1,352,765	3,596,177	Crucible Steel Co. of America
9.72	138,344,200	118,858,896	7.36	5.20	10,182,919	6,181,777	[17]Colorado Fuel & Iron Corp.
10.84	80,559,351	102,852,785	1.05	5.33	844,810	5,484,090	Pittsburgh Steel Co.
11.49	55,825,306	61,460,919	3.46	3.37	1,930,045	2,072,666	[21]Lukens Steel Co.
16.64	46,496,523	41,380,694	6.36	7.90	2,958,109[8]	3,267,707[8]	Granite City Steel Co.
19.51	90,068,564	118,849,560	3.69	7.77	3,325,964	9,234,983	Sharon Steel Corp.
16.31	35,895,460	47,480,574	6.28	8.67	2,255,840	4,116,444	Alan Wood Steel Co.
9.39*	13,739,443	10,509,015	7.97*	15.85*	1,094,387*	1,665,718*	Midvale Co.
12.64	105,863,359	126,780,255	1.86	5.39	1,967,324	6,833,384	Allegheny Ludlum Steel Corp.
10.77	22,505,562	29,743,309	2.83	5.46	636,716	1,625,150	Continental Steel Corp.
16.48	31,209,110	34,072,411	8.71	5.19	2,718,352	1,767,863	Laclede Steel Co.
27.41	36,735,489	34,504,429	13.84	12.08	5,084,181	4,167,550	Keystone Steel & Wire Co.
15.43	25,346,721	36,739,240	0.00	6.37	90,409*	2,339,996	[25]Follansbee Steel Corp.
11.59	29,347,046	31,760,743	5.88	7.34	1,724,223	2,331,034	[24]A. M. Byers Co.
33.86	42,708,329	75,570,115	4.07	6.60	1,737,506	4,989,019	Copperweld Steel Co.
30.34	28,564,916	26,641,518	7.86	6.31	2,243,939	1,680,477	[16]Northwestern Steel & Wire Co.
41.51	16,865,512	18,940,250	7.63	13.18	1,287,063	2,496,859	Rotary Electric Steel Co.
11.36	26,531,036	22,433,568	8.51	6.93	2,258,952[15]	1,553,783	[17]Carpenter Steel Co.
23.37	49,774,601	58,904,663	9.81	7.66	4,885,424	4,511,550	Portsmouth Steel Corp.
20.83	33,885,545	51,257,670	2.10	5.10	711,452	2,615,269	Barium Steel Corp.
10.74	$7,217,937,986	$7,940,761,467	7.12	6.65	$514,133,177	$528,357,192	Total (or average)

	Current Liabilities[3] 1949	Current Liabilities[3] 1948	Ratio of Current Assets to Current Liabilities 1949	Ratio of Current Assets to Current Liabilities 1948	Working Capital 1949	Working Capital 1948	
51	$455,267,896	$504,855,814	2.06—1	1.93—1	$483,843,683	$469,505,437	United States Steel Corp.
91	214,241,303	224,952,249	2.78—1	2.25—1	382,411,733	280,644,542	Bethlehem Steel Corp.
58	66,070,859	78,448,966	3.36—1	2.89—1	156,087,187	148,633,092	Republic Steel Corp.
06	50,716,997	63,135,628	2.90—1	2.70—1	96,422,995	107,387,078	Jones & Laughlin Steel Corp.
66	46,065,651	53,602,411	4.62—1	3.78—1	166,936,851	149,085,855	Youngstown Sheet & Tube Co.
84	39,331,329	40,845,736	4.28—1	3.40—1	129,042,022	98,162,348	National Steel Corp.
18	35,653,147	37,362,528	4.24—1	4.25—1	115,634,562	121,275,990	Inland Steel Co.
51	48,032,617	55,915,670	3.23—1	3.01—1	107,211,797	112,533,281	[11]Armco Steel Corp.
72	11,475,725	13,910,444	5.55—1	5.05—1	52,176,175	56,388,428	Wheeling Steel Corp.
14	10,769,845	17,418,719	3.84—1	2.87—1	30,591,492	32,541,895	Crucible Steel Co. of America
33	17,351,929	16,867,352	2.44—1	2.13—1	24,998,094	19,094,581	[17]Colorado Fuel & Iron Corp.
05	7,829,880	14,107,138	3.77—1	2.67—1	21,680,466	23,550,867	Pittsburgh Steel Co.
58	4,463,040	9,687,707	3.74—1	1.92—1	12,234,632	8,939,351	[21]Lukens Steel Co.
46	8,290,004	6,350,263	1.82—1	2.09—1	6,774,084	6,904,783	Granite City Steel Co.
32	11,966,232	19,422,537	3.04—1	2.28—1	24,392,742	24,774,495	Sharon Steel Corp.
88	4,624,296	6,519,920	2.16—1	1.99—1	5,377,744	6,444,468	Alan Wood Steel Co.
27	1,006,879	1,428,165	10.81—1	9.71—1	9,875,615	12,434,962	Midvale Co.
79	10,961,399	12,592,714	3.00—1	3.37—1	21,946,677	29,904,565	Allegheny Ludlum Steel Corp.
07	1,746,629	2,920,402	5.13—1	3.52—1	7,215,211	7,373,605	Continental Steel Corp.
66	2,372,856	3,763,918	3.53—1	2.33—1	6,009,712	5,024,548	Laclede Steel Co.
34	2,920,402	6,331,355	2.96—1	1.83—1	5,712,981	5,237,809	Keystone Steel & Wire Co.
49	3,129,995	5,785,730	3.55—1	2.33—1	7,990,442	7,677,219	[25]Follansbee Steel Corp.
61	2,698,264	4,587,983	3.68—1	2.61—1	7,236,803	7,377,678	[24]A. M. Byers Co.
11	2,853,018	8,048,469	4.16—1	2.06—1	9,014,436	8,569,442	Copperweld Steel Co.
86	3,165,983	3,245,993	1.88—1	1.66—1	2,783,832	2,146,693	[16]Northwestern Steel & Wire Co.
64	1,619,282	1,317,558	2.85—1	2.78—1	2,997,407	2,344,006	Rotary Electric Steel Co.
08	2,909,006	3,248,983	4.36—1	3.69—1	9,776,290	8,733,425	[17]Carpenter Steel Co.
42	6,598,801	7,833,354	2.92—1	2.19—1	12,678,901	9,361,588	Portsmouth Steel Corp.
54	5,766,778	8,789,343	1.80—1	1.57—1	4,589,943	5,031,411	Barium Steel Corp.
91	$1,079,900,042	$1,233,297,049	2.78—1	2.44—1	$1,923,644,509	$1,777,083,442	Total (or average)

ought iron.
1949 and

company's
no steel in-

949 and $7

[29] Plus one share of common stock for each 25 shares held.
[30] Includes $403,757 in 1949 and $594,483 in 1948 for amortization of emergency facilities.
[31] Fiscal years were 52 weeks ended Oct. 29, 1949, and Oct. 30, 1948.
[32] Includes accelerated depreciation of $313,833 in 1949 and $338,938 in 1948.
[33] Does not include $65,225 as value of retired stock held in treasury.
[34] Does not include $54,300 as value of retired stock held in treasury and $25,000 as stock subscribed but not issued.
[35] Comparison of corporation's earnings with steel ingot capacity or output would be misleading as corporation buys all hot strip used in manufacture of cold-reduced coils, sheet, strip and seamless roofing.

Copper from the 'Valley of the Moon'

COPPER CANYON: This huge pit is Anaconda's Chuquicamata copper mine in Chile. It is said to contain the world's largest known deposit of copper ore. In 35 years a whole mountain has been cut away leaving a terraced hole 1½ miles long, 1 mile wide and 750 feet deep. From 550 million tons of earth removed, copper ore has averaged 1.86 per cent. Situated in the picturesque "Valley of the Moon," the mine contains treasures of nitrate and iron as well as copper. Less than 3 per cent of the valley has been explored

Copper cathodes are built up electrolytically upon thin sheets of copper, rinsed, loaded onto mill cars and taken to the melting department for conversion into bars and billets

—Wide World

Copper bars and billets are eventually shipped to refineries all over the world

New Manganese Source?

Land in the famous Maine potato country is said to be under lease to a big outfit

NEGOTIATIONS for lease of land in Maine for a possible source of manganese ore are reported being made by Republic Steel Corp., Cleveland.

The land, located in Aroostook county, is said to have been under lease to a major mining interest. Republic declined to comment.

The reports are significant because of the United States' heavy dependence on foreign countries for manganese ore and because of its strained relations with Russia. Every now and then Russia stops its manganese shipments to us. For years it was the largest single source of the ore.

First to Fifth—After a one-month lapse Russia resumed in a small way the export of manganese ore to the United States in February.

Decline in Russia's shipments of manganese ore to the United States had by the end of the third quarter of 1949 reduced the U.S.S.R. to fifth place as a supplier. In 1948 Russia was the largest single supplier, providing a third of all the tonnage imported to the United States. Listed in the order of importance as suppliers to the United States in the first nine months of 1949, the seven largest were: 1. India; 2. Union of South Africa; 3. Gold Coast; 4. Brazil; 5. Russia; 6. Cuba; and 7. Mexico.

Shippers of manganese ore to the United States in January in the order in which they ranked as to tonnage shipped were: 1. India; 2. Gold Coast; 3. Union of South Africa; 4. Brazil; 5. Cuba; 6. Angola; 7. Mexico; 8. Greece; 9. Belgian Congo; and 10. the Philippines.

High-Cost Supply — The area in which Republic Steel is reported to be interested in a lease is what the U. S. Bureau of Mines and the Geological Survey calls a high-cost supplier. Those agencies have listed eastern Aroostook county in Maine as one of a group of U. S. areas in which there are "several hundred million tons of low-grade material containing 1 to 10 per cent manganese, from which manganese could be obtained by known processes at high costs."

Manganese is widely distributed in nature and mineralogical occurrences have been reported in numerous places and in virtually every state. However, no deposits comparable in size and grade to those found in the principal producing countries of the world have been discovered in the United States.

Windows of Washington

By E. C. KREUTZBERG *Washington Editor, STEEL*

The oleo sleeper will be used like a whip on violators of the Federal Trade Commission Act. Civil penalties will probably not be sought any more in the future than they have been

THE SLEEPER in the Oleomargarine Act probably will not be very costly to industry.

That provision in Public Law 459 provides that violators of a cease-and-desist order under the Federal Trade Commission Act are liable to a fine of up to $5000 multiplied by the number of days they continue the violation.

Whip in Case of Need—The amendment should make very little difference in present practice.

FTC spokesmen say: "It is a whip—if we need to use it to force stubborn violators into compliance. But we encounter such cases very rarely. Most noncompliance results from misunderstandings and is not deliberate. In such cases civil penalties have not been sought in the past and will not be sought in the future."

Even were the commission minded to recommend heavy fines, it is not the commission nor the Department of Justice (which brings the actions) but the courts that determine the amount of the fines—and the courts have gagged over imposing heavy fines under the FTC Act. The biggest penalty ever asked by the government for an FTC violation was for $750,000 against the Canadian Ace Brewing Corp., Chicago. The judgement actually awarded by the court was $4900.

Qualifications—The fine cannot, as many feared, be imposed for violation of any interlocutory or intermediate order of FTC, nor can it be imposed for any violation antedating a final order of the commission. Sen. Walter F. George (Dem., Ga.) explained it this way during the Senate debate: The civil penalty becomes applicable against a violator of an FTC cease-and-desist order "only after due hearing, and after the commission waits the full 60 days for the obtaining or filing of an appeal, and after the filing of the appeal and the final disposition of the appeal in the courts, and 30 days thereafter, if there is affirmation of the order."

Tongue in Cheek—A factor that might be considered by the courts in imposing penalties on the basis of so many dollars per day for each day of continued violation is the congressional history of the amendment. It was the general understanding in Congress that the sleeper was introduced with tongue in cheek. Says Rep. W. R. Poage (Dem., Tex.): "The amendment was introduced by Senator Aiken and improved by Senators McCarthy, Wiley, Mundt and others, all of whom were opposed to the Oleo bill and thought this might bring votes against the bill."

Healthy Industry Has To Export

The steel industry, says a government statistician, has a much greater interest than generally realized in supporting the administration's efforts to get more dollars into

Those "invisible" exports are heavy

the hands of foreign countries through increased exports to the U. S. and elsewhere.

Between 16 and 17 per cent of the present employment in the iron and steel industry depends on exports; so the industry would be hard hit if exports were allowed to drop off because of dollar shortage abroad after expiration of the Marshall Plan in 1952.

"The rule-of-thumb formula," he told STEEL, "is that for each ton of visible steel exports there is another ton of invisible exports—the latter term, of course, refers to the large quantities of steel in such exported assemblies as automobiles, office equipment, machinery and many other products. On the basis of this rule, 1949 exports of steel must be figured as twice the 4,816,000 net tons visibly exported in that year.

"Figuring visible and invisible steel exports at 9,632,000 net tons, it becomes apparent that the quantity of steel exported in 1949 was 16 to 17 per cent of the total production of 58,104,000 net tons of finished rolled steel for 1949."

The above-mentioned rule-of-thumb formula resulted from studies conducted by the Bureau of Labor Statistics for the year 1939 and for the first half of 1947. In 1939, it was found, 57,000, or 11.8 per cent, of the 483,000 employes of the steel companies owed their employment to exports; of those 57,000 the bureau figured, 29,000 owed their employment to visible steel exports and 28,000 to invisible steel exports. In the first half of 1947, 131,000, or 19.7 per cent, of the 665,000 employes of the steel companies owed their jobs to exports, 67,000 due to visible and 64,000 due to invisible steel exports.

BLS tentatively has scheduled another study of this kind for the latter part of this year—to be launched if sufficient time of personnel is available. A chore of this type is a cumbersome one since to compute the "invisible" steel exports it is necessary to know the weight of steel in each one of a large number of products—and that means a lot of work.

You Don't Have to Know Russian

If you want to find out what the Russians are writing on prospecting for metallic ore, drop a line to the U. S. Geological Survey, Washington 25. The free translations of six Russian articles discuss soil and water analyses, the use of a new instrument known as a luminoscope and the measurement of sulfate ion concentration in soil.

Veep Skips Over Several

Without consulting either the Democratic or Republican leaders, Vice President Alben W. Barkley omitted the names of most of the senators who had been active on the now revived Small Business Committee.

Some leading senators were surprised—and displeased.

He left off Sen. Kenneth Wherry (Rep., Nebr.) who headed the committee in the 80th Congress and Sen. James E. Murray (Dem., Mont.) who was chairman in several previous Congresses. The new chairman is a

former New Dealer and now an ardent Fair Dealer, Sen. John J. Sparkman (Dem., Ala.). Other members are: McFarland, O'Conor, Long, Gillette, Humphrey, Hunt, Benton, Tobey, Saltonstall, Hendrickson, Thye and Schoeppel.

As before, the committee has not authority to initiate legislation.

NSIA To See Air Might

Although they may not hear a thing about flying saucers, 175 handpicked guests of the National Security Industrial Association will meet at the Wright-Patterson base in Dayton, O., to find out about aerial warfare. The conducted tour-and-lecture arrangement is being made with the Air Force.

After touring the installations, the visitors will hear lectures on tactical and strategic warfare, research and development, supersonic flight, guided missiles and procurement.

Look for Competitive Effect

Next phase of the steel industry inquiry of the House (Patman) Small Business Committee is aimed at finding out the effect on competition of the steel industry's acquisitions of the businesses of fabricators who were former steel industry customers.

Particular attention will be paid to the effect of acquisitions of steel drum and structural fabricators. Hearings are tentatively booked for late May.

Know Where To Borrow Money?

For small businesses plagued with finance problems, the Commerce Department has revised a small booklet, "The Small Businessman and Sources of Loans."

It lists private and government sources of business loans, tells how to go about getting them and about how much to expect to pay for loan capital. You can get a copy for 15 cents from the Superintendent of Documents, Government Printing Office, Washington 25, or from any Commerce Department field office.

New Head of Road Builders

Lt. Gen. Eugene Reybold, wartime chief of Army Engineers, is the new executive vice president of the American Road Builders' Association.

Headquarters are at 1319 F St., N. W., Washington. General Reybold succeeds Charles M. Upham, retired after 24 years with the Road Builders' Association. The general, who retired from the Army in 1946, says he will work toward: "A continuing highway program on a reasonable and adequate scale, a technically and financially sound basis and a high business plane."

LT. GEN. EUGENE REYBOLD
...American Road Builders' Association

Conference To Clear the Air

Manufacturers and users of antipollution devices—filters, sonic collectors, dust precipitators, spray towers, scrubbers, incinerators, smokeless coal-burning outfits and the like—will be interested in the big Air Pollution Conference that the government will stage, May 3-5.

It is to be held in the Commerce Department auditorium in Washington. About 80 papers are scheduled to be read. The "Equipment" session will be of special interest to the metalworking industry. Also of interest: Relation of chimney height to pollution.

A session on the ill effects of pollution upon respiratory, skin and other ailments will feature a thoroughgoing presentation of the Donora-"smog" story.

The federal government continues to utilize specialized information as a tool in fighting air pollution: Its latest publication summarizes restrictions on the sizing of fuel-burning equipment imposed under 20 city and county ordinances. Contained in the 19-page brochure, "Fuel-Burning Equipment Dimensions Required by Smoke-Abatement Ordinances," are drawings of different types of installations and data on minimum furnace-setting heights that are required in different areas.

If you are interested in the brochure, write to the Publications Distribution Section, U S. Bureau of Mines, 400 Forbes St., Pittsburgh 13. If you are interested in the authors of the papers to be presented at the air pollution conference, write to Dr. Louis C. McCabe, chief, Office of Air & Stream Polution, U. S. Bureau of Mines, Washington 25.

Tariff Hearing Date Set

May 24 has been set by the State Department for the start of hearings by the Committee for Reciprocity Information to measure opposition to proposals to lower tariff rates on many imported commodities.

Almost 2500 commodities are under consideration for such concessions—textiles, pottery, toys, chemicals, paper, glass, fish products, clocks, wines, whiskey, china, dairy products, etc. The list may be obtained from Edward Yardley, executive secretary of the committee, Tariff Commission building, Washington.

The proposed tariff reductions will be considered at Torquay, England, starting Sept. 28, when a delegation appointed by the State Department will meet with representatives of foreign powers to negotiate new reciprocal trade agreements. So far such deals have been scheduled with 17 countries. Many more are expected to ask for consideration. The 17 are Australia, Austria, Belgium, Brazil, Canada, France, West Germany, Guatemala, Korea, Luxembourg, New Zealand, Norway, the Netherlands, Peru, Turkey, Union of South Africa, and the United Kingdom.

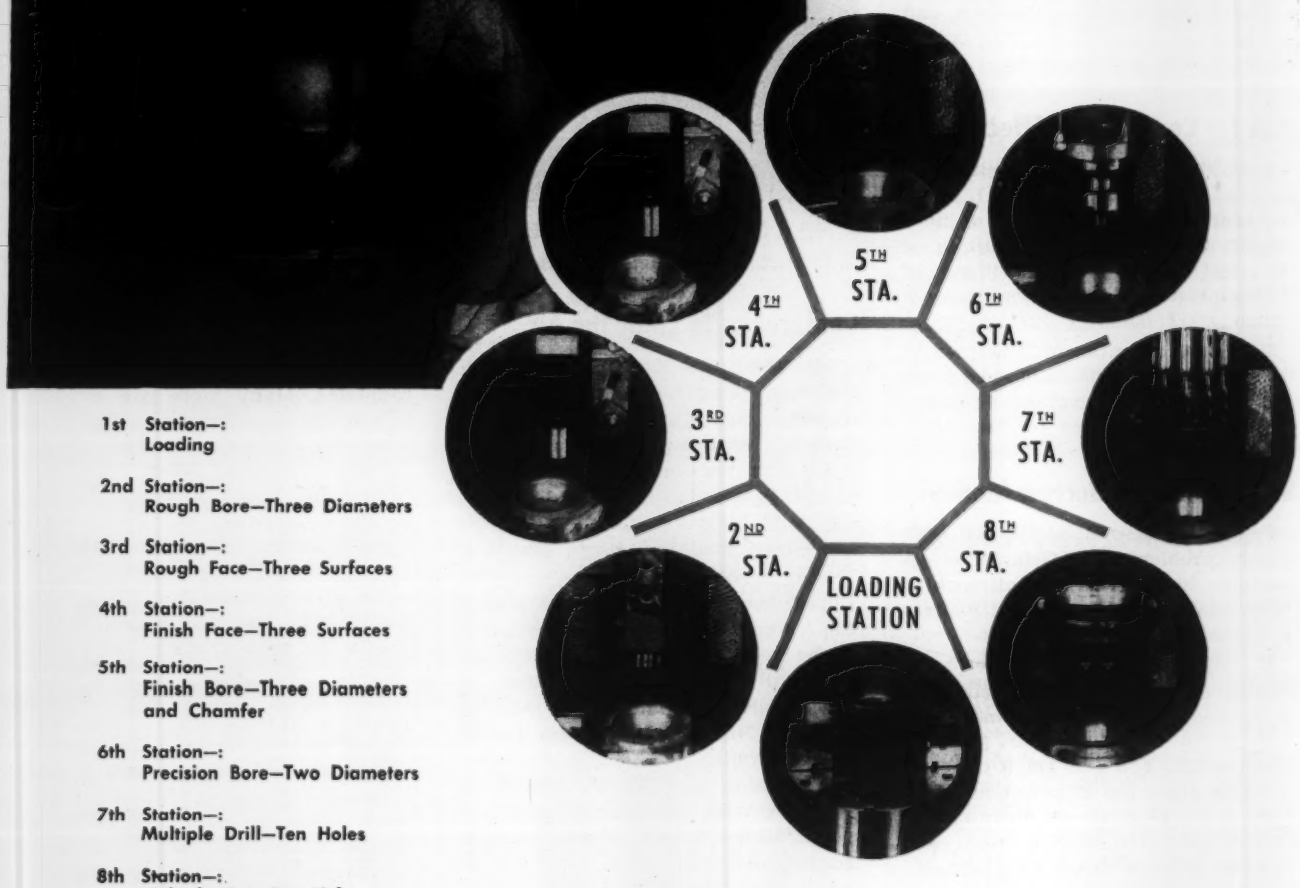
To give consideration to growing hostility to the administration proposals to reduce many duty rates further, the Steel Subcommittee, House Labor Committee, will hold hearings starting May 2. Chief witnesses will be labor union officials who are worried over fears that increased imports of products which their members manufacture in the United States will cause serious unemployment (STEEL, Apr. 17, p. 54).

Thumping Labor Victory

The President's veto of the Kerr natural gas bill (hewing to the line that brings government price control over another area of business) is in reality a resounding victory for labor. The CIO had fought it vigorously, labeling it "outrageous." The feeling among congressmen who voted for the bill is high and might cost the President many votes on his Fair Deal Program.

A KEY UNIT TO LOWER COSTS

Mult-Au-Matic Multi-Au-Matics are tooled for Versatility for a variety of the shorter run jobs or tooled for volume production, users have for many years proclaimed these machines, "Key units in lowering our manufacturing costs".



1st Station—:
Loading

2nd Station—:
Rough Bore—Three Diameters

3rd Station—:
Rough Face—Three Surfaces

4th Station—:
Finish Face—Three Surfaces

5th Station—:
Finish Bore—Three Diameters and Chamfer

6th Station—:
Precision Bore—Two Diameters

7th Station—:
Multiple Drill—Ten Holes

8th Station—:
Multiple Tap—Ten Holes

Many of today's economic problems are being solved through lower manufacturing costs. A Mult-Au-Matic installation may be the solution to some of YOUR PROBLEMS.

Let Bullard engineers study your manufacturing methods with a view towards reducing your manufacturing cost via the Mult-Au-Matic Method. Write for Mult-Au-Matic "Pictorial".

THE BULLARD COMPANY

BRIDGEPORT 2, CONNECTICUT

By A. H. ALLEN *Detroit Editor, STEEL*

Mirrors of Motordom

Chrysler strike losses to date probably total $1035 million. About 450,000 cars and trucks would have been built in the 63 working days thus far lost

DETROIT

IN TRYING to tote up the dollars-and-cents losses growing out of the Chrysler strike—now of 63 working days' duration and the longest tieup in the corporation's history — some "trade authorities" are coming up with figures bordering a little on the fanciful. One estimate, rendered a week ago and widely reprinted, placed the grand total at $1092 million. This was arrived at by adding the retail value of 385,000 cars and trucks, the estimated value of purchases which would have been made from 6500 suppliers, wages to 89,000 employees on strike and the conjectured wages of 50,000 idled supplier employees. The trouble with this is that purchases and wages are all a part of the retail value of cars and trucks that might have been built, so there is a large duplication of figures.

Try It This Way—Assume loss of 450,000 cars and trucks as of this week (based on output of 7100 daily) with average retail value of $2300 each, which may be on the low side. That is $1035 million in all. Now, out of that Chrysler's 10,600 dealers lost their 25 per cent markup which represents $259 million, or an average of $24,000 each and the equivalent of three months' gross profit. Out of the remaining wholesale product value of $776 million, wages to 89,000 employees in Chrysler plants would run to about $75 million and purchases of materials, supplies and services $494 million. The latter figure is based on a factor of 0.636 cited in the corporation's annual report as the proportion of the 1949 income dollar allocated to this account. Obviously wages paid to suppliers' working forces would come out of the $494 million and could not reasonably be added to the grand total as was done in the recent estimate.

However, an indeterminate number of suppliers have kept going on Chrysler orders, with the finished product either being sent to designated warehouses or stacked up in suppliers' plants. So the result has not been a complete loss on their part. Beyond that, some vendors have diverted capacity normally consigned to Chrysler to other customers. There is nothing particularly unfair in this, it's just good business, although the anguish of Chrysler buyers and follow-up men is readily understandable.

Misty Math—You cannot add sheep, goats and pigs and come up with apples. The absolute top dollar loss involved in the three-month strike, figuring in everbody from the man at the foundry shakeout to the stockholder, would appear to be the gross retail value of cars and trucks which might have been built, and that appears to come close to $1035 million.

Broadly speaking there is more to the story, for every dollar paid out in wages or to suppliers or to dealers or to stockholders starts to turn over through the economy, with benefit to hundreds of enterprises, so the effect of suspension of such dollars goes well beyond the initial recipients. Then, of course, there must be considered the taxpayer who has been saddled with meeting the costs of emergency relief for families of strikers. The Detroit welfare department alone has dished out $1.2 million for this purpose. On top of that the UAW has been collecting special assessments from all its working members to the tune of $1 per week for the last eleven weeks. This total take now is well beyond $7.5 million and has another week to go, if Chrysler remains strikebound. The UAW officers declare this fund can be used only for strike relief, yet outlays thus far have been less than $2 million.

Spilt Milk—How long would it take Chrysler to make up its losses? The certain answer is that the losses never will be recouped. As in every strike, all parties lose. However, for the fun of figuring it, assume, daily production can be moved up from 7100, prevailing just before the strike, to a projected 8500 which would involve round-the-clock manufacturing and two-shift assemblies six days a week. Based on a loss of 450,000 vehicles, the 1400 daily margin provided by overtime would erase the deficit in 321 working days, or a little over 53 weeks. No one in his right mind believes the lush automotive market of today will continue uninterrupted for 53 weeks. About 90 days more is what many observers can see.

They Want the Trimming — The same trend is confirmed by Chevrolet which finds that projections for the first five months of this year, based on dealer orders, call for 78 per cent of passenger car production in the deluxe type, featuring higher price to cover more luxurious fittings, interior and exterior. For all of last year, the deluxe type amounted to 43 per cent of the total. Every ounce of pressure is being forced on Chevrolet assemblies, and passenger cars have climbed above the 6000 per day level. Despite this, many dealers say new customers will have to wait for deliveries, particularly if they specify definite color, accessories and the like. Assemblies of Chevrolet's Powerglide transmission at Cleveland are reported "up to schedule" at around 1000 units daily, although this is somewhat behind the increased pace of car production, since the effort was being made to furnish the transmission on at least 20 per cent of the passenger car turnout.

Chevrolet sales officials are especially gratified over the strength shown in truck sales. In March, for example, commercial vehicle sales totaled 37,660, which was 12 per cent higher than the same month a year ago.

Slow Pick-up—While Cadillac production for the first quarter of the year was below that of a year ago—17,942 against 20,732—and it was the

Auto, Truck Output

U. S. and Canada

	1950	1949
January	610,211	445,092
February	504,954	443,734
March	613,000*	543,711
April		569,728
May		508,101
June		623,689
July		604,351
August		678,092
September		657,073
October		601,021
November		474,731
December		384,318
Total		6,533,641

Weekly Estimates

Week Ended	1950	1949
April 1	139,821	119,088
April 8	133,172	131,870
April 15	147,657	131,821
April 22	145,000	141,227

Estimates by Ward's Automotive Reports

* Preliminary.

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only General Motors division to report a decline, the explanation is simply that a fairly sweeping model changeover in January and difficulties with restoring the flow of bodies in desired volume prevented meeting planned schedules. The March total of 9125 assemblies proves the point since it represents better than half the output for the quarter. It was a record for the division, the previous high being 8247 in August last year.

K-F Loses $30 Million

Kaiser-Frazer's loss of $80 million last year, after a carry-over tax credit of $9 million, was not altogether unexpected, since sales fell off sharply last year, actually from $341 million to $104 million. Success of K-F in 1947 and 1948 was predicated on what Joe Frazer prefers to call "availability" and that was no measuring stick last year. The company's annual report observes that the deficit was brought about by three factors—insufficient financing making it impossible to carry out long-range planning, lack of new models and a diversified line, and the return of a competitive market. An RFC loan of $34 million appears now to have corrected the first two troubles.

The K-F organization will have to battle out the third one. The report lists total assets of over $90 million, with current assets of about $35 million and liabilities of $11.6 million.

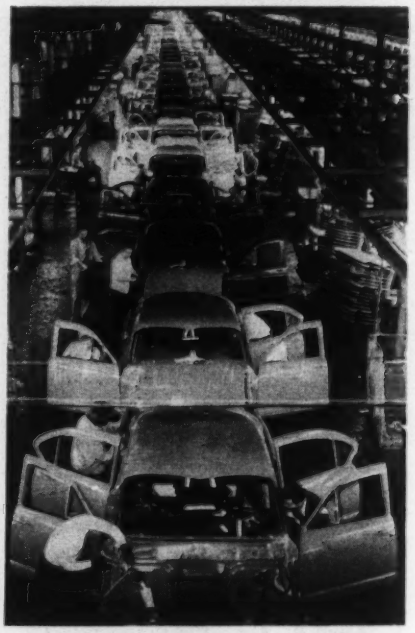
Production at Willow Run on the new Frazer line is moving ahead on the basis of approximatelly 300 cars a day.

Kaiser models are gradually picking up speed, with several hundred already moved to dealers and daily output exceeding 100. Official announcement and price is slated May 10. The unnamed small Kaiser still is on the calendar for late June.

Packard Sales Lag

At the annual meeting of Packard stockholders last week, it was explained that there is a "little lull" in current business which is expected to correct itself. Assemblies are on a four-day basis, with the weekly total running about 1475. For the year, the total is off sharply from the same period of 1949—approximately 21,000 against 32,000 a year ago. Shareholders were told the company is in "wonderful shape" and plans to dish out some $19 million this year for plant, machinery and tools, compared with a little less than $8 million last year. This 137 per cent increase in the plant and equipment account testifies to the extent of the model change which the company now has under way. Completely new body styles will be offered for the 1951 series, and they are radically different from present designs. Briggs Mfg. Co. is well along with the new body program.

The bulk of last year's tooling expense was charged to the Ultramatic transmission, now being installed on 85 per cent of all cars built. The size of this year's budget suggests a new V-8 high-compression engine might be a part of the planning.



1951 MODELS: Now that elaborate retooling for new models is complete, thousands of workers are back at the Willow Run plant of Kaiser-Frazer Corp. turning out 1951 models. The first Kaisers are scheduled to be in K-F showrooms by the end of the month. The view here is of one of two long lines on which Kaiser and Frazer bodies are made ready for final assembly

Coloring the News

After a three-month drought of new cars at Chrysler, it is pretty tough for the publicity experts to find anything to talk or write about. In this blue mood, they might logically be expected to think about color. So, for what it is worth, 26.1 per cent of new Chrysler buyers last year selected one of four shades of green offered by the division. Blue ranked second in favor, with 23.2 per cent, black third with 17.3 per cent, gray 15.3 per cent, maroon 5.4 and silver 4.6.

"Management Market" in 1950

Herbert M. Gould, general manager of the Motors Holding Division of General Motors, coins a new term to describe the 1950 market. He says it is neither a sellers' market nor a buyers' market, but rather a "management market"—one in which success or failure depends importantly upon the efficiency of management and the degree to which it can predetermine income accurately, control expense, and attract and maintain "truly quality personnel aggressively working under inspired leadership."

Car Buying Rush Continues

Rush of retail car buying continues for most producers, although you can except Hudson, Packard, Kaiser-Frazer and Willys-Overland, the latter two because there has not been time for their new models to find their appeal.

Buick says its dealers sold 16,351 cars in the first ten days of April, 73 per cent more than in the same period a year ago and better than the first sales period of March. Another interesting thing about Buick's April orders is that 45 per cent of them are for the so-called Riviera-styled bodies in sedans and coupes of the two more expensive series in the line.

Apparent significance is that buyers are not much concerned as yet over price.

Fluid Drive on Dodge Trucks

Dodge now is offering fluid drive on 50 models of its trucks, with nominal ratings of ½, ¾ and 1-ton. It is a conventional type of fluid coupling unit, one half with 44 vanes and the other with 48, positioned between the engine and clutch. No change is made in the standard synchro-mesh transmission, the fluid coupling simply providing a smoother start, less shock, better tire mileage.

Fluid drive was initially introduced on Dodge trucks in 1948, as a feature of a light, door-to-door delivery model.

Two Groups Get Half of Steel

The automotive industry and steel warehouses are the two biggest customers of Jones & Laughlin Steel Corp., Pittsburgh.

Reviewing its 1949 activities, the company reports those two groups took half of its steel output. The company's shipments of finished steel totaled 3,042,000 tons. To nine market classifications it was distributed percentagewise as follows: Automotive, 28; warehouses, 22; containers, 11; industrial, 11; oil and gas, 8; export, 6; construction, 5; transportation, 3; and miscellaneous, 6.

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Efficient design and operation of bar rolling mills enable us to furnish rounds, squares, hexagons and octagons in a wide range of sizes.

ARISTOLOY STEELS

STANDARD STRUCTURAL ALLOY
BEARING QUALITY • ALLOY TOOL
SPECIALTY • NITRALLOY
CARBON TOOL • STAINLESS
MAGNAFLUX – AIRCRAFT QUALITY

COPPERWELD STEEL COMPANY, WARREN, OHIO

117 Liberty Street
New York, New York

1578 Union Commerce Building
Cleveland, Ohio

529 Fisher Building
Detroit, Michigan

176 W. Adams Street
Chicago, Illinois

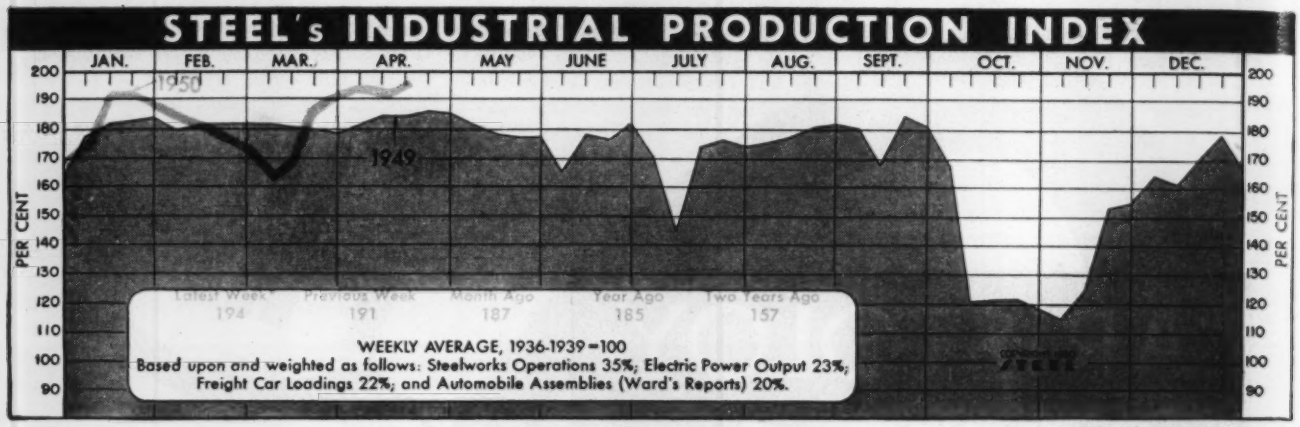
7251 General Motors Building
Detroit, Michigan

3104 Smith Tower
Seattle, Washington

P. O. Box 1633
Tulsa, Oklahoma

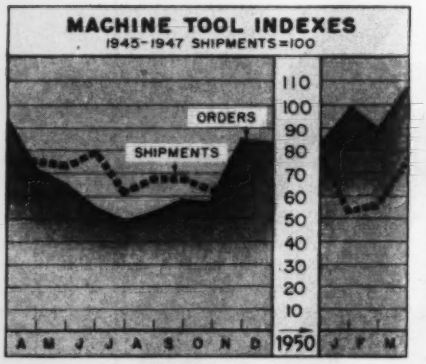
403 W. Eighth Street
Los Angeles 14, California

Monadnock Building
San Francisco 5, Calif.



*Week ended Apr. 15 (preliminary)

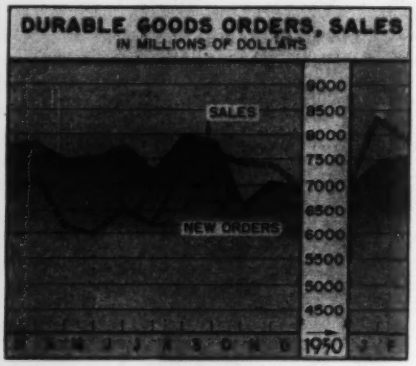
Charts—Copyright 1950, STEEL



Machine Tool Indexes

	New Orders		Shipments	
	1950	1949	1950	1949
Jan.	99.7	87.0	52.4	68.8
Feb.	89.2	80.9	56.1	70.3
Mar.	107.4	93.5	75.4	75.8
Apr.	...	70.1	...	74.7
May	...	63.7	...	72.8
June	...	53.6	...	79.0
July	...	48.0	...	60.7
Aug.	...	51.5	...	67.3
Sept.	...	57.7	...	67.6
Oct.	...	56.8	...	62.3
Nov.	...	84.3	...	67.6
Dec.	...	82.5	...	75.7

National Machine Tool Builders' Assoc.

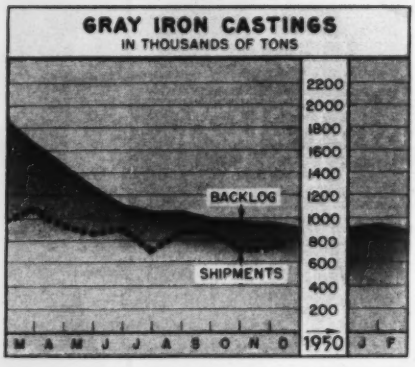


Durable Goods Orders, Sales

In Millions of Dollars

	New Orders		Sales*	
	1950	1949	1950	1949
Jan.	8,377	6,706	7,471	7,550
Feb.	7,852	6,734	7,572	7,757
Mar.	....	7,185	....	7,805
Apr.	....	6,127	....	7,445
May	....	5,993	....	7,488
June	....	6,544	....	7,745
July	....	6,195	....	7,207
Aug.	....	7,407	....	7,982
Sept.	....	7,634	....	7,877
Oct.	....	7,432	....	6,542
Nov.	....	7,402	....	7,041
Dec.	....	7,019	....	6,960

*Seasonally adjusted. U. S. Office of Business Economics



Gray Iron Castings

Thousands of Net Tons

	Shipments		Backlogs*	
	1950	1949	1950	1949
Jan.	913	1,040	914	2,065
Feb.	864	987	873	1,857
Mar.	...	1,075	...	1,639
Apr.	...	929	...	1,446
May	...	867	...	1,243
June	...	906	...	1,087
July	...	697	...	1,032
Aug.	...	872	...	1,048
Sept.	...	881	...	980
Oct.	...	716	...	955
Nov.	...	719	...	939
Dec.	...	862	...	892
Total	...	10,551		

*For Sale. Bureau of the Census

Issue Dates of Other FACTS and FIGURES Published by STEEL:

Constr. Valuation ..Apr.17	Gear Sales Apr.3	Radio, Television ..Mar.27
Employ., Steel Apr.17	Ind. Prod. Index...Apr.10	Ranges, Gas Jan.2
Forgings, Steel Apr.3	Ironers, Standard ..Apr.17	Refrigerators, Elec..Mar.27
Fab. Struc. Steel...Apr.10	Machine Tools Mar.27	Trucks, Elec. Ind..Jan. 2
Foundry Equip. ...Apr.17	Price Indexes Apr.3	Vacuum Cleaners ..Apr.3
Freight Cars Apr.17	Pumps, Orders Apr.3	Wages, Metalwkg...Mar.20
Furnaces, W. Air...Jan.2	Purchasing Power..Apr.10	Washers Apr.10
Furnaces, Indus. ..Apr.17	Ranges, Electric ..Mar.27	

Index Hits New High

Another new peak was reached by STEEL's industrial production index in the week ended Apr. 15. The index climbed 3 points in the week to 194 per cent (preliminary) of the 1936—1939 average, 1 point higher than the previous weekly high posted two weeks earlier. Heavy schedules by the automobile builders offset a small drop in electric power distributed to make the new record possible.

Tool Orders at Four-Year Peak

Machine tool orders exceeded builders' hopes in March and climbed to a four-year high. Automotive accounts dominated the month's activity as the National Machine Tool Builders' Association index reached 107.4. Foreign orders recovered to 25 from the February index figure of 18.8. March shipments also climbed, reaching 75.4 from 56.1 in February.

Association indexes are based on average monthly shipments in 1945—1947 equaling 100. Average annual shipments in the base period were $355 million.

Gray Iron Outlook Better

A definite uptrend in gray iron foundry operations brightens the foundry picture. The upswing began at the start of the year and the first two months' production was about 12.5 per cent higher than that of the last two months in 1949.

Improvements both in production and backlogs continued in March and April is better still. Many gray iron foundries which were operating on a three-day week at the close of 1949 are back to a five-day week. Foundrymen are cautiously examining the future and feel that the present level of operations should continue for the rest of the first half at least.

The Business Trend

Forecasters busy trying to explain why business is better than they said it would be. Cautious voices drowned out by those who see happy days ahead

ROSE-COLORED glasses are becoming standard for economic forecasters. A cautious few who call the economic shots as they see them are sometimes shouted down, often drowned out by those who see nothing but happy days ahead.

What brought on this aura of plenty? The experts who predicted a midyear dip appear to have missed the mark. Why?

Buying of consumer durables, which is keeping many metalworking companies working at capacity, is higher than anticipated. Some attempt is made at explaining the gap between expectation and realization by pointing to the payment of insurance bonuses to veterans. What lets the air out of this balloon is the fact that forecasters knew these payments were forthcoming at the end of 1949.

Since no reasonable explanation has been made, to date, of the cause for the business boom, it is difficult to predict how long it will last or how far production will fall once the boom breaks. Most companies appear to be in no danger of any serious readjustment. Inventories are not high and purchasing is rapid enough so that inventory buildup is out of the question.

Automobiles . . .

Largest steel consumer and the pacesetter for metalworking is still the automotive industry. Even with the industry producing at a pace that is ahead of last year's alltime record, sales are keeping ahead of outturn particularly in the more popular makes. No longer are buyers able to get any make without waiting and with a few extras thrown in without cost. In addition to waiting for the car of their choice, customers in some cities are reportedly doing a little monetary "greasing" to speed deliveries. Although the Chrysler strike has dragged on longer than expected the automotive industry is outstripping last year's production. Disregarding the 110,000 units produced by Chrysler before the strike, the other U. S. builders have assembled an average of 128,000 cars and trucks weekly this year. This pace is equivalent to an annual rate of 6.4 million vehicles, far ahead of the 1949 record.

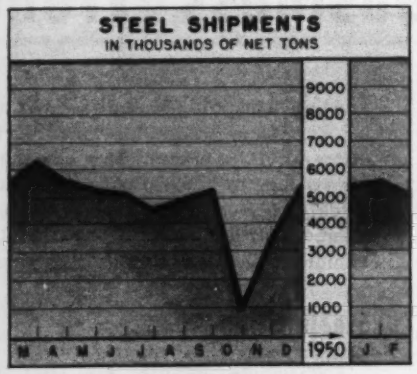
Steelmaking . . .

Purchasing agents say they are plagued with shortages and allocations for steel even though the steel industry is producing at an alltime high. Last week output of steel for ingots and castings was at practical capacity and a new weekly mark was written into the record, topping the former high set in March, 1949. Sheets and pipe are still the tightest items and no letup is in sight. Conversion deals are being consummated by a number of metalworking companies who are endeavoring to satisfy demand for their products. Rumors of gray market deals occasionally are circulated but observers say the gray market isn't even a dirty white.

Construction . . .

Engineering construction is taking a back seat for no one. Cumulative

BAROMETERS of BUSINESS		LATEST PERIOD*	PRIOR WEEK	MONTH AGO	YEAR AGO
INDUSTRY	Steel Ingot Output (per cent of capacity)†	98.0	97.5	90.0	99.0
	Electric Power Distributed (million kilowatt hours)	5,863	5,898	6,015	5,343
	Bituminous Coal Production (daily av.—1000 tons)	1,904	1,968	2,200	1,909
	Petroleum Production (daily av.—1000 bbl)	4,999	4,998	4,827	4,969
	Construction Volume (ENR—Unit $1,000,000)	$177.6	$304.4	$213.2	$158.2
	Automobile and Truck Output (Ward's—number units)	147,657	133,172	134,453	132,126
	* Dates on request. † 1950 weekly capacity is 1,906,267 net tons. 1949 weekly capacity was 1,843,516 net tons.				
TRADE	Freight Car Loadings (Unit—1000 cars)	708†	700	726	766
	Business Failures (Dun & Bradstreet, number)	201	203	208	184
	Money in Circulation (in millions of dollars)‡	$27,072	$27,133	$27,023	$27,507
	Department Store Sales (changes from like wk. a yr. ago)‡	none	none	−1%	+7%
	† Preliminary. ‡ Federal Reserve Board.				
FINANCE	Bank Clearings (Dun & Bradstreet—millions)	$12,418	$14,324	$13,115	$12,004
	Federal Gross Debt (billions)	$255.4	$255.1	$255.9	$251.4
	Bond Volume, NYSE (millions)	$25.0	$20.3	$23.0	$12.3
	Stocks Sales, NYSE (thousands of shares)	12,683	8,110	8,295	3,712
	Loans and Investments (billions)†	$66.6	$66.6	$66.3	$61.0
	United States Gov't. Obligations Held (millions)†	$35,920	$36,118	$36,463	$32,397
	† Member banks, Federal Reserve System.				
PRICES	STEEL's Weighted Finished Steel Price Index††	156.13	156.13	156.13	154.01
	STEEL's Nonferrous Metal Composite‡	158.2	157.8	157.1	202.3
	All Commodities†	152.1	152.0	152.0	157.5
	Metals and Metal Products†	169.7	169.6	169.3	172.7
	† Bureau of Labor Statistics Index. 1926=100. ‡ 1936-1939=100. †† 1935-1939=100.				

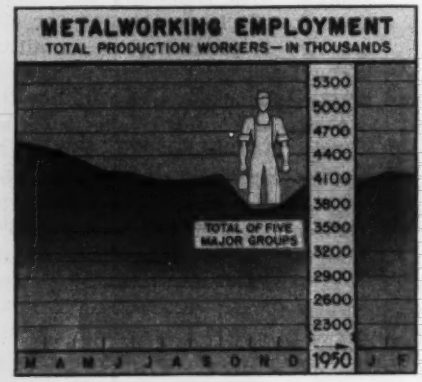


Steel Shipments

Net Tons

	1950	1949	1948
Jan.	5,482,691	5,788,632	5,410,438
Feb.	5,134,780	5,519,938	5,046,115
Mar.	.....	6,305,681	5,978,551
Apr.	.....	5,596,786	5,096,161
May	.....	5,234,862	5,321,375
June	.....	5,177,259	5,476,774
July	.....	4,534,855	5,229,880
Aug.	.....	4,918,314	5,329,060
Sept.	.....	5,236,196	5,511,474
Oct.	.....	935,037	5,952,008
Nov.	.....	3,296,809	5,732,256
Dec.	.....	5,410,902	6,056,282

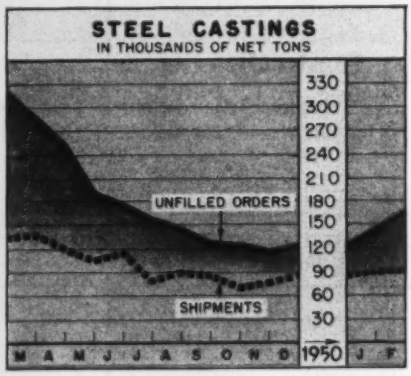
American Iron & Steel Institute



Metalworking Employment

1949	Prim. Mtls.	Fab. Prod.	Mach- inery	Elec. Mchy.	Trans. Equip.
Feb.	1,077	752	1,133	607	1,021
Mar.	1,062	729	1,108	585	1,017
Apr.	1,028	706	1,066	560	1,012
May	991	683	1,014	538	955
June	971	679	977	518	995
July	934	671	939	505	1,014
Aug.	932	688	927	507	998
Sept.	938	708	935	531	1,017
Oct.	559	677	922	548	986
Nov.	737	666	908	546	898
Dec.	952	988	929	558	896
1950					
Jan.	960	693	936	560	990
Feb.	969	701	957	576	914

Bureau of Labor Statistics



Steel Castings

In Thousands of Net Tons

	Shipments		Unfilled Orders*	
	1950	1949	1950	1949
Jan.	88.8	140.6	142.5	338.9
Feb.	91.8	135.0	165.2	320.2
Mar.	....	138.9	....	284.8
Apr.	....	120.0	....	250.5
May	....	106.2	....	191.5
June	....	116.1	....	173.2
July	....	78.7	....	155.5
Aug.	....	90.0	....	143.6
Sept.	....	86.5	....	127.7
Oct.	....	70.7	....	124.8
Nov.	....	76.4	....	117.9
Dec.	....	84.5	....	122.9

*For sale. Bureau of the Census

Charts—Copyright 1950, STEEL

total for the first 15 weeks in 1950 shows $3,077,157,000 in contracts, 39 per cent above the corresponding period a year ago. Private construction for the period aggregates $1,785,216,000 and tops the like 1949 total by 61 per cent. Public construction is 18 per cent above last year and totals $1,291,941,000.

Bituminous Coal . . .

Amid all the joy about booming industrial output, the downtrend in bituminous coal production and growing coal stockpiles are often overlooked. In the week ended Apr. 8, the latest period for which figures are available, bituminous coal production dropped another notch to 11,425,000 tons. The latest total is about 500,000 tons lower than for the preceding week.

Truckloadings . . .

Volume of freight transported by motor carriers in February decreased 3.1 per cent below January but increased 16.1 per cent over February, 1949, says American Trucking Associations. Carriers reporting to the association transported 3,147,597 tons in February, as against 3,247,372 tons a month earlier and 2,712,104 tons in the corresponding month a year ago. Carriers of iron and steel hauled about 6 per cent of total tonnage.

Output Still Rising

April's index will top the estimated March figure of 184, says FRB chairman

FURTHER increase in the Federal Reserve Board's industrial production index is expected in April, says Thomas B. McCabe, chairman. He estimates the March index will be 184 per cent of the 1935-1939 average, a 19 point gain from the 1949 low. FRB's index is closely followed by businessmen as a highly reliable gage of industrial activity.

Although there is still some tendency to hedge, estimates are being made that the board's index will average more than 180 for the entire year. The estimate represents a sizable upward revision from earlier predictions.

Government officials including Commerce Secretary Sawyer, the President's Council of Economic Advisers and President Truman himself call attention to the high level of business activity and the soundness of our economy. Some of the compliments are of the left handed variety seasoned with comment about unemployment.

Businessmen's reports show high sales and sizable backlogs in many lines. Here are a few views on metalworking activity and prospects:

Cincinnati Milling Backlog Up

Cincinnati Milling Machine Co.'s backlog is up more than $1.5 million since the start of the year. Current backlog for the Cincinnati firm is over $15.4 million, compared with $13.9 million at the end of 1949. The backlog is now above its level on Jan. 1, 1949.

First quarter shipments were down slightly below the corresponding period a year ago but quarterly figures of this type are not accurate indicators of general trends. The company is working hard on improving its profit margin and in the last three years has succeeded in boosting it from 5.1 per cent in 1947 to 7.1 per cent in 1948 and 7.4 per cent in 1949.

Monarch Shipments Will Climb

Substantially increased shipments in the second quarter, based on order volume in the first three months in 1950 are predicted by W. E. Whipp, board chairman, Monarch Machine Tool Co., Sidney, O. Mr. Whipp says Monarch's order backlog is at a higher level than it has been in the last eight months.

Net earnings and sales in the first quarter were below those in the like period last year. First quarter 1950 sales of $1,247,038 yielded a net of $101,732, compared with a $117,731 net on sales totaling $1,841,848 in the corresponding 1949 period.

Sales Gain for Fruehauf

Fruehauf Trailer Co. sales in the first quarter were nearly $3 million higher than in the like 1949 period, says Roy Fruehauf, president. The second quarter got off to a good start, Mr. Fruehauf continues, as sales in the first ten days in April were virtually double the figure for the first ten days in March. Sales estimate for the first quarter is $22 million and the sales total in the same period a year ago was $19,119,612.

Bendix Field Stocks Low

Because of a sizable increase in sales in the January-March period this year, Bendix field inventories are down, says Judson S. Sayre, president, Bendix Home Appliances Inc., South Bend, Ind. Production at the company's plant continues at a rate topping 36,000 automatic laundry units per month but field inventories are down to a three to four week supply from a normal seven to eight week stock.

This year's first quarter sales total shot up to $11,425,443, about 2½ times the sales in 1949's first quarter. Because of the large sales gain net profit was a healthy $651,599. In the corresponding period a year ago a small net of $68,709 was reported.

Gas Customers Increase

Gas Appliance Manufacturers Association reports a 50.3 per cent increase in residential gas customers and a 358 per cent increase in liquid petroleum gas residential customers during the last ten years.

An estimated 27,083,000 domestic gas ranges and 14 million automatic gas water heaters were in use at the end of 1949. More than 10 million domestic gas ranges and 6,835,000 automatic gas water heaters have been purchased in the last five years.

Soss Adds Production Line

To meet increased demand for automobile hinges, Soss Mfg. Co., Detroit, is installing a seventh production line.

The company expects increased demand from its nonautomotive customers also, for several of them are planning increased production for this year. Hinge demand from the nonautomotive field is growing in importance in the firm's total volume.

Utility Growth Continues

Privately owned companies will spend $2.1 billion this year for facilities

THERE will be no slump in business for firms supplying the electric utilities in 1950. Privately owned utilities will spend about $2.1 billion for new facilities this year and will add 5,060,000 kilowatts of generating capacity. The dollar figure is about the same as in 1949 but the generating capacity exceeds 1949's 4,739,314 kw added.

Publicly owned utilities are expected to match the 1,367,419 kw installed in 1949, giving the nation about 69.1 million kw of generating capacity at the end of this year. Thus privately owned and publicly owned utilities will have a generating capacity at the end of this year which is 78 per cent higher than at the end of 1939 (see accompanying chart).

Public Plants Mushroom—Percentagewise, publicly owned utilities have grown more rapidly in the period. Privately owned facilities will be about 63 per cent larger at the end of this year while publicly owned facilities will be nearly three times as large as at the end of 1939.

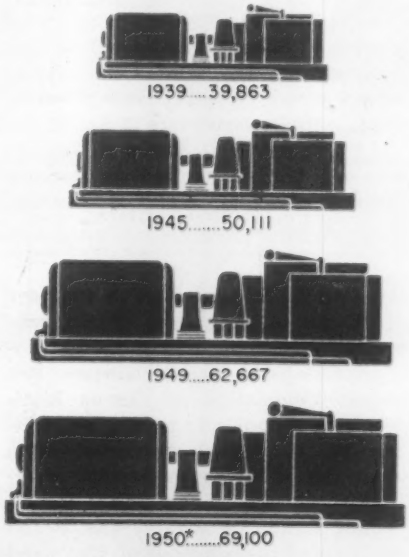
Expenditures by electric utility companies, municipal plants and rural co-operatives are up sharply over prewar. Construction expenditures in 1939 totaled $506.5 million, rose to $2,843,500,000 in 1949 and will be about the same in 1950. A small decline in outlays is expected next year when electric utility companies wind up their postwar expansion programs.

Postwar Phase Ending — Completion of postwar expansion programs does not mean an end to growth in generating capacity, utilities companies point out. It means the end of a phase of expansion. Increasing uses for electricity in plants and homes will bring further construction and development. Even if the rate of increase in generating capacity in the next ten years is half as large as it was in the last ten years, then there will be a large volume of business for builders of electric equipment.

Backlogs for generating station equipment are considerably reduced from their postwar peaks. There are two reasons for the decline: Greatly expanded facilities for turning out the equipment and the aforementioned nearly completed expansion programs. The swollen backlogs of a few years ago represented the accumulation resulting from wartime years when expansion did not keep pace with the need.

Capacity Growing

. . . nearly doubles in decade



Figures in thousands of kilowatts.
Source: Edison Electric Institute. * Estimated

Housing Starts Total 110,000

March was the best homebuilding month in history. Home building starts during the month totaled 110,000, an increase of 30,000 (38 per cent) over February and 40,600 (59 per cent) over March, 1949.

Although a good volume of home building was expected this year, the first three months show a surprising aggregate of 270,000 foundations laid. In the first quarter a year ago housing starts numbered 169,000. For the last nine months homebuilders have surpassed, by an ever widening margin, their volume for the same month in the preceding year.

Telegraphic reports to the bureau show local building permits for new housing in March were up in all principal cities. Greatest increases occurred in Los Angeles, Boston, Detroit, St. Louis, New York, Philadelphia, Pittsburgh, Milwaukee, Dallas, Houston and Fort Worth, Tex.

Harris-Hub Expanding

A broader line of metal furniture will be produced by Harris-Hub Bed & Spring Co., Cicero, Ill.

When the company announced acquisition of the Harvey, Ill., plant of American Stove Co., Carl Harris, president, revealed that the company would begin manufacture of metal summer furniture, chairs, gliders, etc., and will resume production of institutional furniture like cabinets and chests for hotel and hospital use. Kitchen wall and base cabinets will also be manufactured at the new facility.

Men of Industry

B. F. GALLE
. . . general works manager, Mills Industries

B. F. Galle was appointed general works manager, **Mills Industries Inc.,** Chicago. He was associated with Frigidaire Division, General Motors Corp., for 16 years in a manufacturing supervisory capacity. For the last nine years he was factory manager with several leading manufacturers, resigning his last post as works manager, City Products Corp., to join Mills Industries Inc.

—o—

James S. Meeker, formerly production and general manager, **Super Gear Drive Corp.,** Chicago, was elected president and a director.

—o—

John W. Unroe, formerly assistant manager, Steubenville Works, **Wheeling Steel Corp.,** Wheeling, W. Va., was appointed general manager, succeeding the late **William H. Warren. R. C. Diehl** continues as assistant general manager of the works.

—o—

William C. Spencer Jr. was appointed Baltimore district manager, and **Ralph F. Bickel,** assistant manager, **Horace T. Potts Co. John W. Reckard** was appointed manager of steel sales in the Philadelphia area. Mr. Spencer succeeds **J. Theodore Fritz,** who has retired.

—o—

Frank L. Blodgett was appointed sales manager, hard surfacing division, **Alloy Rods Co.,** with headquarters at the main office and factory, York, Pa.

—o—

Norton Co., Worcester, Mass., appointed **W. Earle Shumway** as manager, sales engineering department, abrasive division, and **Fred L. Curtis** as sales manager, western region.

OLIVER W. BONNAFE
. . . vice president at Lapointe Machine Tool

Oliver W. Bonnafe was elected vice president in charge of research engineering at the **Lapointe Machine Tool Co.,** Hudson, Mass., with which he has been associated for over 30 years. He is well known for his contribution to the advancement of broaching.

—o—

Gustaf Peterson was appointed consulting metallurgist for **Edgcomb Steel Co.** in Philadelphia and Charlotte, S. C., and is succeeded as manager of tool steel sales by **Robert Shattuck.**

—o—

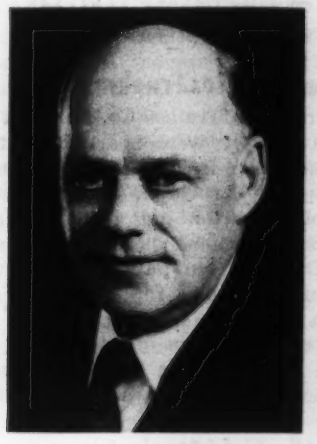
Neil P. Cullom was elected chairman of the board of directors, **R. Hoe & Co. Inc.,** New York, succeeding **H. M. Tillinghast,** retired due to ill health. **Joseph L. Auer,** president, continues as chief executive officer. Mr. Cullom, general counsel to the company, has been a director for 13 years.

—o—

Walter F. Schanz was named service manager for the West Coast appliance division, **Westinghouse Electric Corp.,** with headquarters in San Francisco. He succeeds **James A. Brown,** who was transferred to New York as general service manager for Westinghouse Supply Co.

—o—

Dr. Carl E. Swartz, division engineer of Kellex Corp., New York, was named chairman of the metals research department at **Armour Research Foundation** of Illinois Institute of Technology, Chicago, succeeding **W. E. Mahin,** promoted from chairman of metals to director of research of the foundation. Before joining Kellex Dr. Swartz was for ten years chief metallurgist of Cleveland Graphite Bronze Co., Cleveland.



J. H. DEVOR
. . . Wagner Electric president

J. H. Devor was elected president, **Wagner Electric Corp.,** St. Louis, where he has been vice president since 1941. He succeeds **P. B. Postlethwaite,** elected chairman of the board, a newly created position, and who continues as chairman of the executive committee. **H. N. Felton,** manager of the St. Louis sales branch, was elected vice president in charge of sales. **L. W. McBride,** credit manager, was elected assistant secretary-treasurer to succeed **A. K. Bahret** who has reached retirement age after 50 years with the company. All directors of the company were re-elected and **G. A. Waters** was added to the board, replacing **A. H. Timmerman.** Mr. Waters is vice president in charge of manufacturing. Mr. Timmerman, vice president and director, is retiring after 50 years' association with the company.

—o—

John Yezbak, director of public relations for **Timken Roller Bearing Co.** for the last seven years, has opened an advertising and public relations office in the National City Bank building, Cleveland.

—o—

John M. Hooper was appointed a staff engineer in the engineering department of **Columbia Steel Co.,** Torrance, Calif. Before joining Columbia he was assistant general superintendent of the Fontana, Calif., plant of Kaiser Steel Corp.

—o—

Riverside Metal Co., Riverside, N. J., appointed **George W. Spanberg** manager of its Chicago sales office. **James T. Duffy III** was named assistant in the Chicago office. A member of the Chicago sales staff for the last 14

These JOHNSTON CINDER POTS Reduced Slag-handling Costs

Why not service-test them in your operations?

Perhaps you judge cinder-pot service by the number of trips to the slag dump—that's one place Johnston Cinder Pots have established service records.

Your disposal system may require a fast turn-around cycle—a specification made to order for Johnston Cinder Pots which force out skulls after molten slag is dumped.

But the real cost reduction results from the *extra heat-hours* of operation you can expect when you service-test Johnston Cinder Pots and Slag Handling Equipment.

You'll find construction features which

- **resist the distorting effects of unequal expansion and contraction.**
- **reduce wall sag when handling hot pots.**
- **minimize firecracking and checking in pot walls.**

Johnston Cinder Pots have reduced slag-handling costs in many blast furnace and open-hearth operations. Mack-Hemp engineers will show you *where, how,* and *why.*

MACKINTOSH-HEMPHILL COMPANY

PITTSBURGH & MIDLAND, PA.

MACKINTOSH-HEMPHILL PRODUCTS INCLUDE: rolls . . . steel and spaded alloy castings . . . completely integrated strip mills . . . heavy duty engine lathes . . . the new Mackintosh-Abramson straightener . . . improved Johnston patented corrugated cinder pots and slag-handling equipment . . . shape straighteners . . . end-thrust bearings . . . shears . . . levellers.

years, Mr. Spanberg succeeds the late **Charles Sumner.**

—o—

Walter A. Zielke was appointed general director of production control,

WALTER A. ZIELKE
. . . production control, Fisher Body

Fisher Body Division, General Motors Corp., Detroit. He succeeds the late **Herbert E. Shutt.** Mr. Zielke joined Fisher Body in 1919 at the Ternstedt Division in Detroit.

—o—

Albert E. Zeisel has resigned as vice president and general sales manager, **Eutectic Welding Alloys Corp.,** New York.

—o—

Gordon W. First, for many years district manager of **Clark Controller Co.,** Pittsburgh and New York offices, has been appointed district manager of the St. Louis area. **Frederick H. Neuhardt,** associated with the New York office for several years, now succeeds Mr. First as district manager in that area.

—o—

Benjamin A. Ragir was elected president, **Ekco Products Co.,** Baltimore, succeeding **Arthur Keating,** who has held the posts of both president and chairman of the board and who continues in the latter position.

—o—

Hyman-Michaels Co., Chicago, elected **William Page** vice president. **Max Mabel** is now associated with the scrap department and **S. J. Barsy** has joined the executive staff.

—o—

Frank Parr, who now fills an executive position with the British Iron & Steel Federation, is joining **Whitehead Iron & Steel Co. Ltd.,** London, England, and its associated companies as a special director.

—o—

J. M. Robbins was elected vice president—manufacturing, **B. F. Goodrich Rubber Co. of Canada Ltd.,** Kitchener, Ont., succeeding **B. M. Costello,** who became vice president—manufacturing, **International B. F. Goodrich,** a division of B. F. Goodrich Co., Akron.

—o—

C. R. Boyer was appointed production engineer and **L. F. Green,** assistant production engineer, **Dravo Corp.,** Pittsburgh.

—o—

A. R. Cochrane, W. A. Falsgraf, and **J. F. Lott** were elected to the board of directors, **Hamilton Steel Co.,** Cleveland. Messrs. Cochrane and Lott are associated with Fort Duquesne Steel Co., Pittsburgh, parent company, and Mr. Falsgraf is an attorney for Hamilton Steel.

—o—

Howard M. Boyd was appointed sales manager for the parts division of **Sylvania Electric Products Inc.,** New York.

—o—

Waldes Kohinoor Inc., Long Island

HARRY WALDES
. . . executive at Waldes Kohinoor

City, N. Y., manufacturer of fastening devices, appointed **Harry Waldes** executive vice president to direct and supervise all administrative affairs of the company.

—o—

Nicholas Kondur was named manager, mold manufacture, plastics division of **General Electric Co.'s** chemical department, Pittsfield, Mass. **James R. Patterson** was appointed West Coast manager of chemicals division of the department, with headquarters at the Anaheim, Calif., plant. He succeeds **C. S. Ferguson,** resigned.

—o—

Lake City Malleable Co., Cleveland, appointed **W. S. Howard** sales engineer for automotive castings. He was recently director of quality control, White Motor Co.

—o—

Walter A. Graham was appointed general manager, **Frontier Bronze Corp.,** Buffalo, succeeding **Vaughan Stocker,** who has left the company to establish his own business in Cleveland.

—o—

Paul F. Bronckhurst, formerly West Coast representative of leading American engineering and construction companies, has joined the staff of **Kaiser Engineers,** division of Kaiser Industries Inc., Oakland, Calif.

—o—

C. F. Harwood and **Frank D. Shumate** have retired from **Worthington Pump & Machinery Corp.,** Harrison, N. J., after more than 40 years of association. Mr. Harwood has been assistant to the vice president, and has been closely associated with the corporation's condenser business and sale of its power plant equipment. Mr. Shumate was assistant manager of the condenser section.

—o—

James W. Eaton was appointed sales engineer, **Sperry Rail Service,** division of Sperry Products Inc., Danbury, Conn. He is assigned to the rail service Chicago office.

—o—

Dr. Robert F. Bacher, atomic physicist, was elected to the board of directors of **Consolidated Engineering Corp.,** Pasadena, Calif.

—o—

Walter E. Anderson was promoted to sales manager of Aerasol products by **Bridgeport Brass Co.,** Bridgeport, Conn. He has served the Aerasol department as head of sales for the midwestern territories for the last 15 months.

—o—

Gordon H. Bannerman was named

GORDON H. BANNERMAN
. . . Columbia Steel, division manager

manager of a newly created tramway division of **Columbia Steel Co.,** San Francisco, subsidiary, U. S. Steel Corp. Authority on design and erec-

tion of aerial tramways, Mr. Bannerman is joining Columbia from the New Haven, Conn., plant of American Steel & Wire Co., also a U. S. Steel subsidiary.

—o—

Raymond H. Blanchard, vice president, **Hood Rubber Co.,** Watertown, Mass., division of B. F. Goodrich Co., was elected president of Hood, succeeding the late **C. Lawrence Munch.**

—o—

Two new directors of **Niles-Bement-Pond Co.,** West Hartford, Conn., are **Alexander H. d'Arcambal,** vice president, general sales manager, and consulting metallurgist of N-B-P, and **E. J. Schwanhausser,** executive vice president, Worthington Pump & Machinery Corp.

—o—

Wesley L. Guiles has become a technical representative, **Flexible Tubing Corp.,** Branford, Conn., and **Jack F. Chapin** appointed development engineer, in charge of product and process engineering.

—o—

Fred J. Reynolds was appointed representative of **Brainard Steel Co.** in Iowa and Rock Island county in Illinois.

—o—

J. S. Robbins was named sales engineer for **Vulcan Mold & Iron Co.,** Latrobe, Pa.

—o—

Daniel Wardlaw was elected vice president in charge of coated abrasive manufacturing for **Mid-West Abrasive Co.,** Owosso, Mich.

M. E. BROOKS
. . . Alcoa chief mechanical engineer

ROBERT C. BENNETT JR.
. . . National Electric VP-SM

M. E. Brooks was elected chief mechanical engineer for **Aluminum Co. of America,** Pittsburgh, succeeding **Benjamin C. McFadden,** retiring from active service after 26 years in that executive capacity, and 30 years' association with the company. Mr. Brooks joined Alcoa in 1923. After serving in various engineering positions he was made assistant chief mechanical engineer in 1948.

—o—

J. P. Barnum was made sales representative for **Copperweld Steel Co.,** Warren, O. His territory will cover the New England section with the exception of Connecticut. He has been assistant district sales manager in the New York district and also in charge of the Boston office of Republic Steel Corp. His headquarters will be in Boston.

Robert C. Bennett Jr. is the new vice president and sales manager of **National Electric Products Corp.,** Pittsburgh, and has also been elected a director. He takes over duties of **Harold J. Newton,** retired.

—o—

Richard W. Figgins, formerly associated with Lustron Corp., Chrysler Corp. and the GMC Truck & Coach Division of General Motors Corp. in styling work, has joined the staff of **Sundberg & Ferar,** Detroit, industrial engineer.

—o—

Arthur H. Brodie was appointed district manager, **Tube Turns of Canada Ltd.,** with headquarters at the company's plant in Chatham, Ont. He plans to spend considerable time in Toronto, where he resides.

OBITUARIES . . .

Randall E. Moyle, president, **Chester Iron & Foundry Co.,** St. Louis, was killed Apr. 15 in an automobile accident.

—o—

Matthew W. Floto, 67, formerly Chicago assistant district manager of sales, **American Steel & Wire Co.,** died Apr. 14. He retired in 1947 after more than 48 years with the U. S. Steel subsidiary.

—o—

Bradford Ellsworth, 69, vice president, **Manning, Maxwell & Moore Co.,** manufacturer of gages and tools, died in Bridgeport, Conn., Apr. 16.

—o—

George W. Spohn, who founded the **Spohn Heating & Ventilating Co.,** Cleveland, in 1914, died Apr. 16.

—o—

James V. Porcello, 47, vice president and general superintendent, **J. H. Holan Corp.,** Cleveland, died Apr. 16.

—o—

Ellwood F. Thum, 64, president of the **Palmyra, N. J., Foundry Co.** and the **Abrasive Alloy Casting Co.,** Bridgeboro, N. J., died at his home in Daytona Beach, Fla., Apr. 10.

—o—

F. T. Nebel, 68, president, **Nebel Machine Tool Co.,** Cincinnati, died Apr. 6. He had been with the firm, formerly known as Rahn Larmon Co., for 40 years and headed it since 1931.

—o—

Harry Keisler, 40, vice president, **Dulien Steel Products Co.,** died in Seattle, Apr. 14.

—o—

George J. Danz, 76, formerly associated with the West Coast steel industry, and for years with **Hofius Steel & Equipment Co.,** where he resigned as president in 1925, died in Seattle, Apr. 10. He had been assistant sales manager for Seattle branch of **Columbia Steel Co.,** and later was attached to Todd Shipyards, Seattle.

—o—

Marvin H. Taylor, 41, design engineer for **National Supply Co.,** at Los Angeles, died Apr. 10.

—o—

James M. Barton, 72, retired president, **Fretz Moon Tube Co. Inc.,** Butler, Pa., died Apr. 14. He became president in 1929, retiring in 1945.

—o—

Alphonse Lipetz, 68, retired chief consulting engineer in charge of research for **American Locomotive Co.** at Schenectady, N. Y., died recently.

—o—

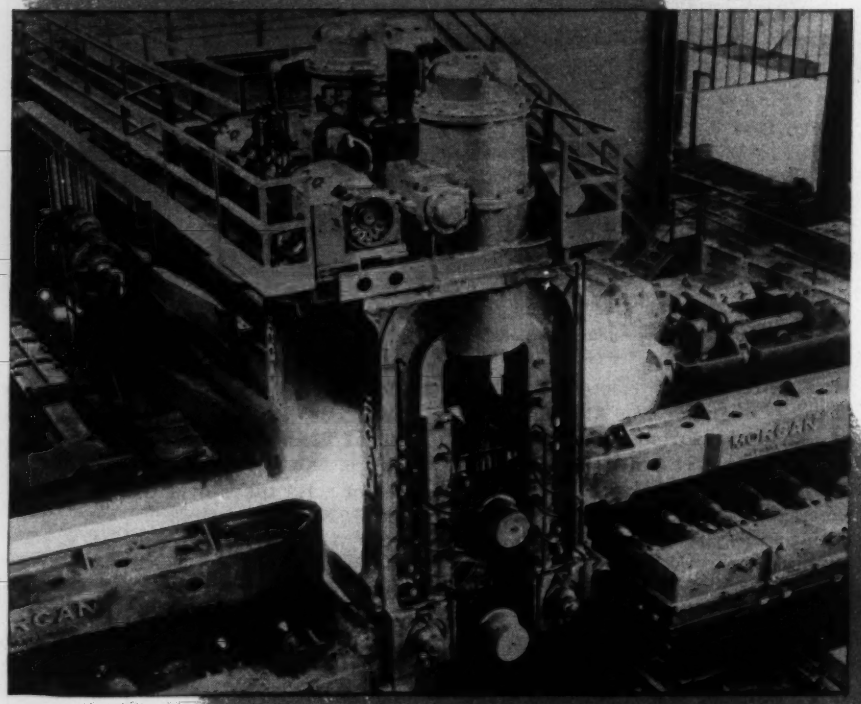
Charles L. Montague, 69, vice president of the Mexican division of **Anaconda Copper Corp.,** died Apr. 7 in Santa Barbara, Calif.

—o—

N. L. Chouteau Walsh, honorary chairman of the board, **Walsh Refractories Corp.,** St. Louis, died Mar. 26.

STEEL MILLS DEPEND ON *Trabon*

FOR *SAFE BEARING LUBRICATION!*



Shown is a Trabon Automatic Lubricating System at work on a Morgan 40"—2 High Reversing Blooming Mill in the plant of a large steel producer.

No neglected or underlubricated bearings here! No worn-out bearings due to lack of lubrication! No down time for replacements or repair! Instead, schedules stepped up, production increased, operating and maintenance costs kept at a minimum.

Trabon systems are sealed—there are no exposed moving parts. Operate efficiently when buried in dust, water, dirt, or grime. Trabon has ONE indicator at the pump, assuring a measured amount of lubricant to each bearing.

Trabon oil and grease systems are job proved in over 20 years' service on thousands of operations where bearings require positive, dependable lubrication. Write or phone your Trabon man today.

TRABON ENGINEERING CORPORATION

1814 EAST 40th STREET
CLEVELAND 3, OHIO

There are more TRABON AUTOMATIC LUBRICATING SYSTEMS in operation than all other makes!

Trabon

OIL AND GREASE SYSTEMS

Production and Engineering
NEWS AT A GLANCE

CUTS FINISHING TIME 40 PER CENT—A manufacturer's finishing time can be reduced by 40 per cent and his storage and handling requirements can be cut about 50 per cent by a fast drying, synthetic enamel developed by United Lacquer Mfg. Corp., Linden, N. J. The metal coating provides the hardness of a baked-on synthetic, but air dries as fast as lacquer in just a few minutes. The finish is particularly useful in plants without baking facilities. Finished products can be handled and stacked within 15 minutes and packed in three or four hours.

EXTENDS SWITCH LIFE—Life of its mercury switches and timer relays are increased by a new filtering process for cleaning triple-distilled mercury developed by Durakool Inc., Elkhart, Ind. According to the company, the cleaned mercury does a great deal more work than that formerly used and also lowers ohms resistance. The mercury is processed under controlled atmospheric conditions for a number of hours. This oxidizes all the dissolved impurities that cannot be removed by triple distilling, and allows them to float on top of the mercury so that they can be removed by a special filtering process.

STOPS "TIME-ROBBER"—No matter how highly mechanized your operations, there always seems to be room for improvement. Case in point is the hub cap finishing setup at Eaton Mfg. Co., Cleveland. To get plated caps from the mechanized plating line to finishing, it was necessary to pack them in boxes. Now, a double row of infra-red drying lamps over a conveyor belt that carries the caps from the plating machine to finishing room eliminates the time-stealing production break in the processing. Caps from the plating machine arrive thoroughly dry inside and out ready for final finishing. They are transferred from the belt, painted and assembled on a production basis.

THE GRAPHITE MYSTERY—Reason why graphite, a solid and "slippery" material is a good lubricant in itself was discovered recently by Robert H. Savage of General Electric's research lab. He found that water in form of vapor was responsible for the seemingly self-lubricating behavior. In testing the material for wear against a revolving copper disk in a vacuum chamber, Mr. Savage found that dry graphite brushes wore as fast as an inch in an hour. But admission of a small amount of water vapor to the chamber reduced wear rate to less than a thousandth as much. Wear of brushes is no great problem in electric motors working on the ground since there is generally enough water vapor in the air to provide the lubricating film of moisture. The discovery, however, may help increase life of graphite brushes in aircraft motors and generators many thousand times through new lubricating methods.

FROM HOURS TO MINUTES—A sand core dryer to be exhibited by Allis-Chalmers Mfg. Co. for the first time at the American Foundrymen's Association convention in Cleveland, May 8-12, virtually cuts drying time from hours to minutes. It is said to reduce production and handling costs, transforming the foundry core room into a cleaner, healthier place to work.

ROTARY CARBURIZING—Low initial equipment costs, reduced gas consumption and no manual handling are among features of a carburizing setup presently used by Ford in heat treating small parts. In the procedure, parts are carburized continuously by passing them through a rotating spiral retort mounted in a furnace, the carburizing gas being introduced in one end of the retort. Tumbling action of the unit is said to provide considerable value in case of parts which may retain oil in closed-end pockets. Action, however, can be controlled to prevent nicking. (p. 74)

NO INTERIOR FLASH — An improved technique for flash welding aluminum tubing described in this issue is of utmost importance especially in refrigeration or similar work. The weld is made in such a manner that no extruded fins remain—either inside or outside the tubing. The metal burned off during flashing practically vaporizes, leaving only a few small globules inside the tube—easily removed by a blast of compressed air. Value of this feature can be appreciated when considering the difficulty of removing flash at a joint in the center of a 20 or 30-foot length of tubing. (p. 79)

ROLLS IMPORTANT—In engineering cold roll forming for high productivity it is important not to skimp on the number of passes. Number of roll passes to be included is not only a question of tonnage or footage per day, but also of producing shapes to close tolerances, free of waviness, curving, bowing, twisting, roll marks and other defects which result in interruptions for adjustments of tooling. (p. 81)

PULLING JOB — Vertical rolls in slabbing mills are not intended to produce too much reduction in rolling slabs. Most reduction is brought about by the horizontal rolls which reduce the thickness every time the section is passed through the rolls. After first few passes, spread of the vertical rolls is adjusted to produce only enough pressure on the slab edges to prevent tearing and ensure proper slab width. (p. 86)

ROTARY RETORT CARBURIZING CUTS GAS CONSUMPTION

Eliminates Manual Loading and Unloading, Minimizes Maintenance

By A. H. ALLEN
Detroit Editor, STEEL

Fig. 1 (above)—Two types of small bearing races carburized selectively at a high rate in a spiral retort gas carburizing furnace. Operations on piece at right are described in text

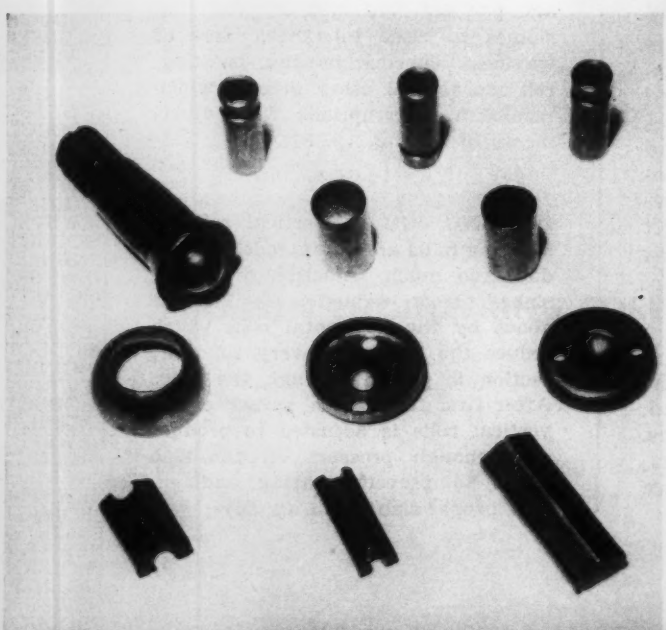
Fig. 2 (below)—Types of small parts handled expeditiously in retort carburizer which tumbles pieces slowly as they move along the spiral

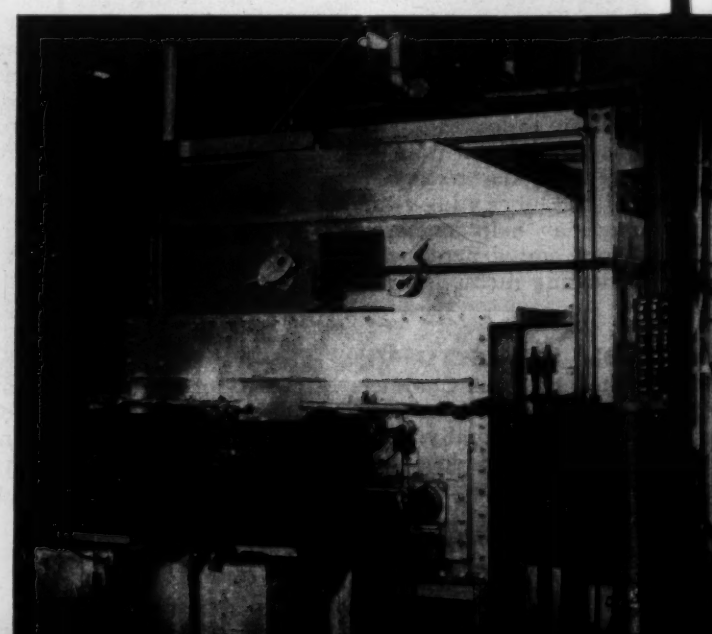
Fig. 3 (right)—Charging end of twin-retort carburizing furnace, showing vibrating feed hoppers which operate only when retorts are moving parts forward. Panels contain six clocks regulating retort cycles

CONTINUOUS gas carburizing of small parts by passing them through a rotating spiral retort mounted in a furnace, with the carburizing gas introduced at one end of the retort, offers advantages in the form of low initial equipment cost, reduced gas consumption, elimination of manual loading or unloading and minimum maintenance. Consideration must be given, of course, to the part being carburized. In the case of parts where nicking would be cause for their rejection, control of the tumbling action is achieved through manipulation of the speed and extent of the rotation. Moreover, tumbling has considerable value in the case of parts which may retain oil in closed-end pockets.

A noteworthy installation of this sort is at the General Manufacturing Division of Ford Motor Co. on Mound road, Detroit. Two small steel parts have been given selective carburizing treatment in a Surface Combustion double-retort furnace. The parts are shown in Fig. 1, the smaller being a passenger car universal joint bearing race, the larger a truck universal joint bearing race. The former is selectively carburized; the latter has a large enough cross section to permit carburizing all over. Similar types of parts which have been retort carburized are shown in Fig. 2.

The bearing race, six required per car, is of SAE 1117 steel, about 1 inch in diameter and 5/8-inch deep, with wall thickness around 3/32-inch. It is produced from bar stock on automatic screw machines and the only areas carburized are the bore,





the annular thrust ring and the inner bottom thrust face. To handle the selective carburizing action, the pieces first are copper-plated in a barrel-type machine, and the plating machined from the bore and thrust faces to expose the bare steel to the carburizing atmosphere.

Transferred in tote pans to the carburizing furnace, they are shoveled into hoppers in front of the twin retorts. Falling onto a vibrating feed table, they move at a uniform rate into the retorts where the carburizing cycle begins.

Retorts Are Conveyors—The retorts actually are the conveyors which move the parts through the furnace. Weighing 5500 pounds each, they are cast 35-15 chrome-nickel alloy iron, carrying a double-pitch spiral or screw on the inside. The latter has 7-inch pitch, with $\frac{5}{8}$-inch section thickness and an 8-inch hole through the center.

Outside diameter of the retort is 26 inches and overall length 16 feet 3 inches; however, since the parts at the discharge end fall through six 4 x 8-inch openings cut in the wall some distance back from the head of the retort, effective travel of the parts is 11 feet 8 inches. The tandem retorts, mounted side by side in the furnace, are driven by chain and sprockets at the discharge end, through a variable-speed drive. Rotation is quite slow, and various cycles can be set to function automatically through time clocks.

Bearing races are on a 3-minute cycle. Thus the retorts move in a direction which carries the parts forward for 95.75 seconds, the equivalent of one-half a revolution. Then the drive reverses for 84.25 seconds; hence in every 3-minute cycle, there is a forward gain of 11.50 seconds. This translates into forward motion of 14.5 inches per hour. The slow speed is required because, to obtain specified case depth of 0.35-0.40 inch, a 7.7 hour carburizing cycle is needed. The slow speed provides adequate tumbling action and avoids damage to the pieces which might result from too sharp an impact with one another.

Carburizing Gas—Carburizing gas is introduced through a 1-inch inlet at the discharge end of each retort and also at four points in the furnace chamber around the muffle. It is a mixture of natural gas and generated RX gas, the former valved to a rate of 35 cubic feet per hour, the latter 850 cubic feet per hour, for the two retorts. Flow is of course counter to that of the parts and the gas is burned as it emerges from the charge end of the retort.

Temperature of the retorts is maintained by 12 sets of U-type radiant tubes, fired through six burners on each side of the furnace. They are manifold in three groups, permitting the furnace to be operated with three zones—heating, carburizing and cooling. However, in the present instance all zones are held at 1700° F. To maintain this heat, burners are "on" for about 70 per cent of the time, being regulated through thermocouple and temperature control instruments in each zone. Gas consumption is about 150 cubic feet per hour per burner.

The carburizing furnace, shown from the front in Fig. 3 is 16 feet 3 inches long and 8 feet 10 inches wide. Heating chamber of the furnace is 5 feet 7 inches wide and 13 feet 7 inches long, with a brick separation wall at a point about three quarters of the way from the front to back. Capacity on the bearing race job is 368 pounds per hour which figures roughly to 7200 pieces.

Oil Quench Tank—Discharge end of the carburizing unit is shown in Fig. 4 which also discloses the arrangement for driving the retorts. Carburized pieces drop through rectangular openings in the retorts through an enclosed chute, and into the oil quench tank located below the floor level. Therefore, no air comes into contact with the hot pieces. They are picked up by a perforated drum inside of which is a spiral screw similar to that in the carburizing retorts. This carries them up out of the quench and into a loading hopper which feeds to a washer, heated by gas-fired immersion tubes.

A second perforated rotating drum picks up the

Fig. 4—Discharge end of carburizer, showing atmosphere gas inlets at ends of retorts. Inclined perforated drum in foreground carries a screw which moves pieces out of oil quench into washer hopper

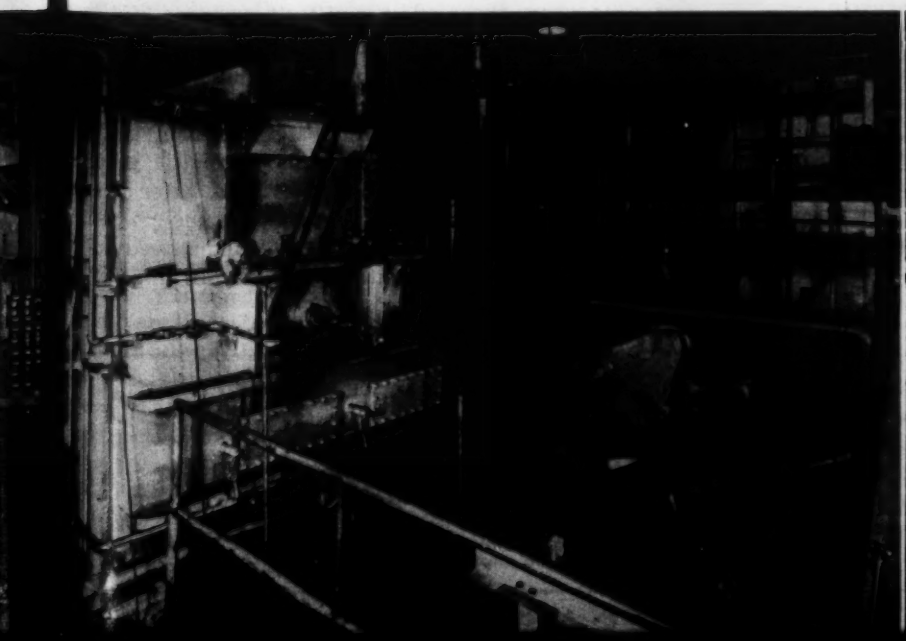
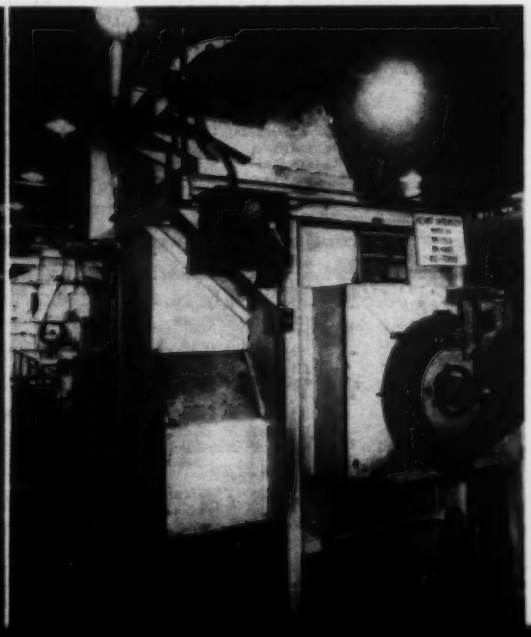


Fig. 5—Single spiral retort carries washed parts through draw furnace, which is a rotating drum, forced convection type unit, and then discharges into tote box shown in the foreground



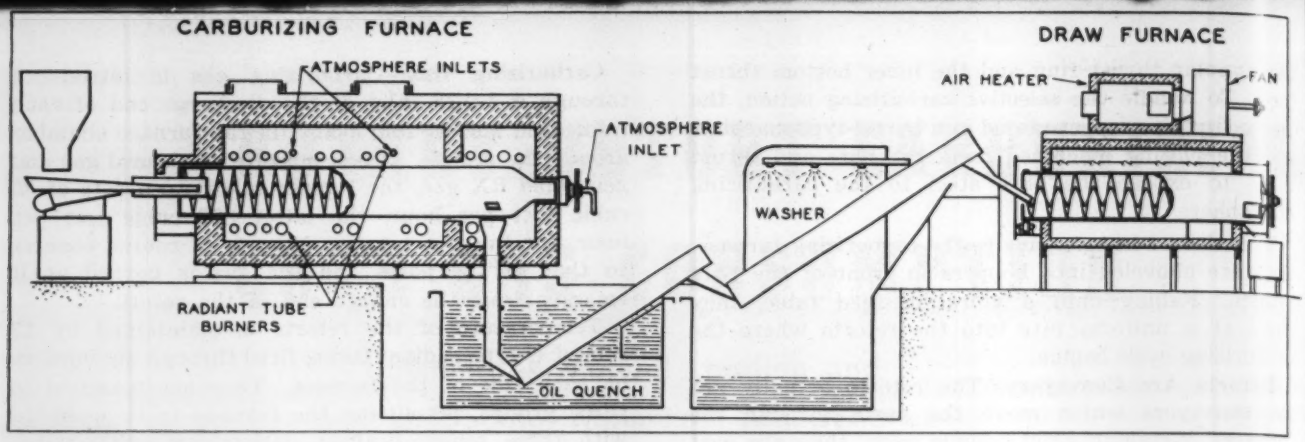


Fig. 6—Schematic layout of carburizing furnace, washer and draw furnace, handling 368 pounds per hour on a 7.7-hour carburizing cycle

parts as they come from the washer and carries them to the draw furnace, which also is equipped with a perforated spiral retort. This furnace is a rotating drum, forced convection type unit, operating at 375° F. Finally, as shown in Fig. 5, the parts drop from the retort into tote boxes and are ready for further processing. Rough and finish grinding of the inside and outside surfaces, plus the machining of a ⅛-inch locking groove in the outside, completes the job.

Cost of the retort carburizing installation is reported to be only about 40 per cent of a comparable pusher-type unit to handle a similar volume. Capacity for the amount of space occupied is exceptionally high. Maintenance and fuel costs are low, since the carburizing retort is also the conveyor moving the parts through the furnace. Pressure of the atmosphere gas inside the retort maintains a tight seal, eliminating the need for special seals to prevent mixture of the carburizing and flue gases.

Low Temperature

ENERGY ABSORBING PROPERTIES

. . . of high tensile steel improved by normalizing

PROPERTIES of Navy high tensile steel are reported to be markedly improved by normalizing. The customary properties such as yield point, tensile strength, elongation and reduction in area are but little changed by this treatment as may be noted in Table I. However, other properties which are being recognized as more and more important are substantially improved. The important properties to be considered are the ability of the material to absorb energy when required to deform plastically and the resistance to brittle type failures at the lower temperatures.

The Navy, by means of a small notched plate tear test, has recently evaluated the low temperature energy absorbing properties for current production of as-rolled and normalized high tensile plate. Summarized briefly, the results of some of this test work are outlined in Table II. The four heats tested were from 1¼-inch plate and were heat treated in the laboratory. For comparative purposes, results of other tests for transition temperature are included in the instances where these additional tests were made.

Metallographic examination discloses that a striking change in ferritic grain size has occurred as a result of the normalizing. Although each of the various heats had essentially the same McQuaid-Ehn grain size, they did not have corresponding ferritic grain sizes in the as-rolled condition; however, after normalizing each heat exhibited a uniform fine-grained structure. The grain size data are summarized together with tear test transition temperature in Table III.

TABLE I
REGULARLY REPORTED PHYSICAL PROPERTIES

Material Designation	Condition	Yield Point (psi)	Tensile Strength (psi)	Elongation 8" (%)
A	As Rolled	50,200	79,000	24.3
	Normalized	55,000	74,400	29.0
B	As Rolled	56,700	77,100	24.0
	Normalized	49,900	71,500	29.0
C	As Rolled	53,200	76,900	25.0
	Normalized	52,800	73,200	29.5
D	As Rolled	52,000	85,900	21.5
	Normalized	57,000	81,300	27.0

TABLE II
TRANSITION TEMPERATURES, DEGREES FAHRENHEIT

Material Designation	Test Specimen		As Rolled	Normalized
A	Tear Test	(1)	60	—70
	Charpy V Notch	(2)	..	..
	Charpy Keyhole	(3)	—45	—
B	Tear Test	(1)	10	—40
	Charpy V Notch	(2)	10	—40
	Charpy Keyhole	(3)	—85	—135
C	Tear Test	(1)	80–90	—60
	Charpy V Notch	(2)	..	..
	Charpy Keyhole	(3)	..	..
D	Tear Test	(1)	120	—50
	Charpy V Notch	(2)	..	..
	Charpy Keyhole	(3)	—5	..

(1) Start of transition from shear to cleavage type fracture
(2) 40 ft-lb level
(3) 20 ft-lb level

TABLE III
GRAIN SIZE

Material Designation	Condition	McQuaid—Ehn	Ferritic	Tear Test Transition Temperature ° F
A	As Rolled	7–8	5–6	60
	Normalized		8	—70
B	As Rolled	7–8	7	10
	Normalized		8	—40
C	As Rolled	7–8	6–7	80–90
	Normalized		8	—60
D	As Rolled	7–8	5–6	120
	Normalized		8	—50

SEEN AND HEARD IN THE Machinery Field

By GUY HUBBARD
Machine Tool Editor

THE HOLE STORY: I am indebted to J. B. Rodgers, vice president, Fensholt Co., Chicago, for an advance copy of one of the breeziest and most interesting tool manuals that I have seen for many a long day. Entitled *The Hole Story of the Keller Airfeedrill,* this book has been prepared for Keller Tool Co., Grand Haven, Mich., to describe and illustrate a type of portable drill "which hangs on by its nose like a leech while it drills a hole."

This book gets under way with the question, "What is a hole?" The answer is: "A hole is nothing surrounded by something." It then goes on to explain that many structures are "90 per cent hole;" that it is a dull day when we do not encounter 50,000 drilled holes. It requires 440,000 holes to fabricate a medium bomber. A medium size ocean liner requires 7,840,500 rivets—each of which requires holes through two, three or more thicknesses of metal.

The final success of John Wilkinson in boring James Watt's steam engine cylinder is characterized as "the hole that upset the world." In other words "without the boring mill that bored the cylinder, there would have been no steam engine, no industrial revolution, no modern age of machinery. It all started with a single hole."

Lest you get the impression that this book contains nothing but the history and economics of holes, let me say emphatically that it is a complete and practical manual on the design and use of a line of unique air-driven, air-feed portable drills which take the physical load off operators by "hanging to the work by their noses." The idea was born in a Los Angeles plane plant during the critical days of the war. It now has been developed to cover effortless drilling of true, straight, holes in a wide variety of peacetime work.

I won't go into details about that. The book does it more completely and in a far more interesting way than I can tell it.

SAVE THE SURFACE: At the ASTE exposition in Philadelphia one of the significant undercurrents that I detected was that in the direction of preservation of vital machined surfaces of machines and tools. Although the paint and varnish industry—with its slogan "Save the surface and you save all"—has stolen a march on the machine and tool industries sloganwise, the fact remains that preservation of finished surfaces is one of the major requirements for cost-cutting in the machine shop.

When it is considered that one of the principal cost items in many a machinery casting weighing hundreds of pounds is represented in a few square inches of plane surfaces or holes finished to the "nth degree" by painstaking scraping or lapping, and when it is considered that the loss or damage of these surfaces literally ruins the machine, one will understand what I am driving at.

The puzzling part of the problem of surface preservation is that in machine shop machinery, gages, etc., the most expensive and vital surfaces are the ones which come in for the greatest amount of wear and abuse. Consider the bed of a lathe, for example, showered all day long by chips and falling work—to say nothing of careless "rapping out" of files. Consider the anvils of snap gages and micrometers and the surfaces of plug gages and even gage blocks—which all too often get about as much consideration as tools in a logging camp. Consider punches and dies. Consider dies for pressure casting and plastic molding. Consider metal finishing and threading rolls.

Preservation of such surfaces has been attempted from several directions; including use of covers; use of wear plates of hard material—both hardened steel and carbides; lubrication designed to constantly push out and flush away foreign particles as well as to prevent metal-to-metal contact; nitriding and other forms of intensive surface hardening; and hard chrome plating. At the technical sessions and in the show itself, I saw ample evidence of interest in all these techniques.

Without intending to plant any ideas that will lead to the formation of another "splinter" engineering society—of which there are too many now—I do respectfully suggest that there is room within the structure of existing societies for a group of specialists on "surface preservation" and on design of surfaces which will retain that "microfilm" of metal which represents the difference between a new machine or tool and a worn out machine or tool.

MACHINE TOOL FORUM: This week—as has been the case once a year since 1936—I find myself a guest of Westinghouse Electric Corp. at what originally was known as the Westinghouse Machine Tool Electrification Forum. Over the years this unique enterprise of adult education has broadened in scope to such an extent that it has become a general engineering forum of the machine tool industry—with Westinghouse generously furnishing the facilities but with industry having free rein as far as the program is concerned.

The evolution of this forum is an outstanding example of the public service rendered by "big business" without expectation of any overwhelming amount of appreciation even from the friends of big business. When an enterprise of this kind evolves little-by-little from small beginnings, too many of us are inclined to take it for granted. Actually, it involves a lot of expense and a lot of work on the part of a lot of topflight company executives.

On the basis of my own 14 years experience with the forum, it is my conviction that only a big "private enterprise" could have handled this thing with the efficiency that it has been handled.

By ALAN BROWN
Bryant Chucking Grinder Co.
Springfield, Vt.

Numbering System Obsolete?

If the numbers on your equipment no longer are fully descriptive, this method worked out by a leading machine tool company will provide some new ideas

MANUFACTURERS of any type of equipment—whether it be conveyors, presses, washing machines, radios or machine tools—have long been faced with the apparently simple yet perplexing problem of devising a numbering system which is easy for their own sales departments and customers to understand.

Difficult To Understand — Numbers on machine tools are difficult to understand. Each company uses a system peculiar to its needs. In some cases the numbers used for a line of machines convey little if anything to the prospective buyer who is trying to understand what is being offered.

Over a period of years, Bryant found that the original numbering system had fallen into disuse and numbers were being assigned to machines with no apparent plan.

Old Way—For instance, a semiautomatic machine with a 16-inch swing was tagged "No. 112." Originally it had been a 12-inch swing grinder but when the machine was changed it retained its old number. As another example, an automatic machine with a 16-inch swing was tagged "No. 212." A semiautomatic with a 9-inch swing had "No. 107" and its companion automatic was a "No. 109."

New Way—This is the way we do it now: A simple numbering system has been set up which identifies the various machines for type and swing. It is based upon four digits. First of the four digits indicates the model of the machine, the present model being "1." When this machine is redesigned, the digit will move up to "2" and so on.

The second digit designates the type of machine with "0" being manual, "1" semiautomatic, "2" automatic, "3" two-spindle, "4" long work.

The third and fourth digits show the swing of the machine in inches.

With the new system, the previously mentioned "No. 112" now is the "1116." the first digit indicates the design; the second digit, "1," that the machine is semiautomatic and the third and fourth digits, "16," that it has a 16-inch swing.

The "No. 109" now is the "No. 1209" with the digits, in order, indicating the design, that it is automatic and that it has a 9-inch swing.

A cam-operated machine also is offered which is "No. 2209," being of the second design, automatic, and with a 9-inch swing.

Features—Special features added to a machine which are not standard are indicated by a letter added to the number. For instance, 1109-W is the standard machine with an addition—an angular slide under the wheelhead.

The accompanying chart with the numbers filled in shows how the system actually works and how it will be introduced shortly in Bryant literature. The change may result in some confusion for the time being but it will eliminate a great deal of confusion in the future.

It should be pointed out that machines during manufacture and assembly carry the usual shop numbers and are individually identified by specific serial numbers to facilitate parts replacement and servicing.

MACHINE TOOL NUMBERING SYSTEM

Group	Type of Machine	Swing 9"	12"	16"	26"	30"	40"	60"
0	Plain Grinder. Hand feed and hand traverse							
1	Semiautomatic. Power feed and power traverse	1109	1112	1116	1126	1130	1140	
	With auxiliary angular slide and wheelhead	1109W		1116W	1126W			
2	Full automatic cycle Electric	1209		1216				
	Cam operated ...	2209						
3	Semiautomatic Two spindles	1309		1316				
	With two cross feeds			1316R		1330R		
	With angular slide under wheelhead	1309W						
4	Semiautomatic Longitudinal ways under workhead, longitudinal traverse and cross feed on wheelslide			1416	1426		1440	1460

Note: First digit indicates series—complete redesign changes number from 1000 to 2000 series.
Second digit indicates group—see column at extreme left; new type machine takes next higher digit.
Third and fourth digits indicate swing. 0.9 = 9-inch swing; 60 = 60-inch swing, etc.
Letters indicate these special features:
A—2 spindle; B—pivoted workhead; C—cylinder; D—loader; E—when used with letter Y means Eclipse Machine; F—high work spindle; H—one feedscrew used for feeding only at forward position of workslide, fixed stop for rear position, including hydraulic cross slide; J—hydraulic cross slide; L—long stroke; M—workhead adjustable longitudinally; P—plain bearing workhead; R—two feedscrews; S—hollow work spindle; W—angular wheelslide; X—gage grinder including refrigerated oil tank, fine feed, precision head, adjustable wheel bracket and coolant filter; Y—miscellaneous features involving major parts not covered by specific letters.

IMPROVED TECHNIQUE FOR FLASH WELDING ALUMINUM TUBING

. . . eliminates interior flash

By CHARLES BRUNO
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Reynolds Metals Co.
Louisville, Ky.

RECOGNITION of the great strength of aluminum alloys is still limited to a comparatively few engineers. Also the old bugaboo of having to heat treat after welding no longer can be applied to aluminum structures because new and improved techniques in flash welding now permit making welds that do not materially reduce the mechanical properties in high-strength aluminum alloys that have been heat treated before welding.

This means that a new field is opening up for the greater use of welded structures made from strong, heat-treated aluminum alloys—especially extruded shapes such as those used in making window and door frames.

Joint Thickness—To understand the thinking back of this development, it is important to examine carefully the effect of joint thickness on joint strength. Suppose you make several butt joints between steel bars, using ordinary 50-50 solder. Make one joint with about 1 inch of solder between the steel bar ends. When pulled in a tensile testing machine, the solder will neck down and show a joint strength approximately equal to that of the solder (6100 pounds per square inch).

Repeat but use only 1/16-inch of solder beween the two steel bars. The joint strength will be found to have increased appreciably; still shorter distances will show further increases. Finally, just tin the two bar ends, wipe together while hot, applying considerable pressure to squeeze out all the solder possible.

If the bar ends were ground perfectly flat and smooth, an amazing thing will be found—the joint strength has increased to a value several times that obtained at first, yet it is still made with soft solder.

That demonstrates the importance of joint thickness. This principle has an important adaptation in flash welding high-strength aluminum alloys by new techniques which produce flash welds measuring less than 0.001-inch across the weld zone. Accompanying micrograph shows such a weld.

Aluminum alongside this extremely thin weld is unaffected as is shown by the uniform grain size right up to the extremely thin line representing the actual weld.

This is important because it means that such a joint can be made in heat-treated, high-strength aluminum alloys without any reduction in strength in the metal adjoining the weld. Since the weld itself is so small, the strength of the joint is also exceptionally high, practically as strong as the adjacent parent metal.

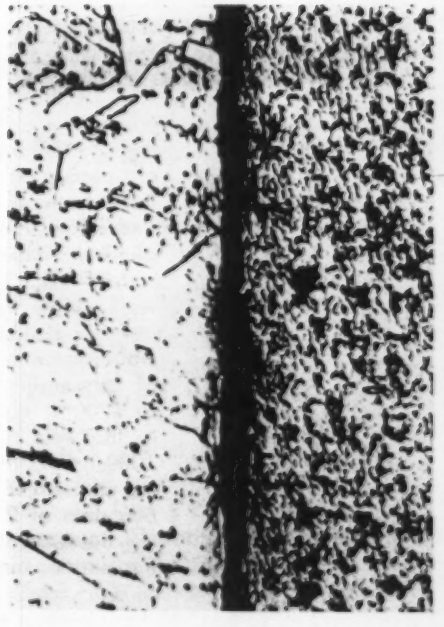

Fig. 1—Micrograph of percussion-welded tubing joint shown in Fig. 2. Weld zone (dark line) is 0.0004-inch across. Note grain structure alongside weld is completely unaffected except for small amount of cold work (flattening of grains) in the aluminum at left caused by high push-up force (20,000 pounds per square inch)

Development work now being done with tubing for refrigeration applications indicates this type of welded joint has great significance. It permits joining heat-treated aluminum tubing to plain tubing; aluminum tubing can be joined directly to copper, stainless steel, Monel, or other alloys without regard to the dissimilar metals in the joint because the fusion zone is so small that practically no intermixing oc-

curs and no change is made in grain structure itself.

Thus all types of condenser and expansion coil structures for refrigeration equipment can be fabricated easily, opening up an entirely new range of design possibilities.

No Flash—Of utmost importance in refrigeration work is the elimination of interior flash. The weld is made in such a manner that no extruded fin remains, either inside or outside the tubing. The metal burned off during flashing practically vaporzies, leaving only a few small globules inside the tube. These can easily be blown out with compressed air.

This is a most valuable feature as can be appreciated when considering the difficulty of removing flash at a joint in the center of a 20 or 30-foot length of tubing, simply not practicable. So eliminating interior flash is a real money-saving feature. Not only that, but it makes practicable for the first time such assemblies of dissimilar tubing as aluminum and other metals.

Joint designs using mechanical connectors are not very satisfactory for refrigeration due to leakage which is a most serious problem. The new improved flesh welds, however, give no trouble from leakage, being perfectly gas tight as shown by extensive testing.

Fig. 2 — Enlarged view of percussion welded joint between copper and alloy type 3S-H14 aluminum tubing, 5/16-inch OD, 1/16-inch wall. Note complete absence of flash. Weld was made with 130 mfd of condensers charged to 2200 v, discharging to the weld through a 1000:1 transformer giving approximately 80,000 amp at 2.2 v during the 1-second flashing period, burning off ¼-inch from end of each piece

"Percussive" Welding—The above joints are made by an improved flash-welding technique that somewhat resembles the Vang percussive welding process. According to the *Welding Handbook*, percussive welding is "a resistance-welding process wherein a relatively intense discharge of energy and the application of high pressure (usually a hammer blow) occur simultaneously or with electrical discharge occurring very slightly before the application of the pressure of the hammer blow." Several variations of percussive welding have been developed through the years. First, it was used almost exclusively for butt welding small diameter wires as in electric light bulbs, using a low-voltage condenser as the energy source and a mechanical system that brought the two parts to be joined together to start the flow of energy, separated them for arcing and then joined them by the hammer blow.

Next the condenser was replaced by a transformer whose primary was connected to a direct-current source.

Upon opening the primary circuit, the collapse of the electromagnetic field produced large currents in the secondary circuit containing the work, somewhat on the order of the familiar stored-energy spot welder now in wide use.

The system was still complicated, however, by the mechanical requirements for establishing contact, separating, and then hammering together the two parts being welded. So a further advance was made in the process using condensers charged to a sufficient voltage to break down the gap between the parts and thus eliminate the necessity for touching and then drawing them apart.

Also, in order to obtain the impact desired immediately after application of the welding current, the work is hammered together by using the energy stored in an air cylinder whose piston is connected to the moving electrode. The piston is held back until the moment of impact by means of an electric solenoid. Welding control circuits open the solenoid circuit at the moment of impact so air pressure then is free to ram home the piston and moveable electrode connected to it.

Precise Control—Such a system provides precise control of every factor involved in the welding operation.

Amount of metal is controlled by amount of energy stored up and dissipated in making the weld. Movement of the electrodes and pressure exerted prior to the hammer blow can be controlled by usual methods.

Hammer blow timing can be precisely controlled by electronic circuits connected with the actual application of welding current, so can be applied at any desired point following the application of the welding current. Strength of hammer blow can be adjusted easily by selection of air cylinder and pressure maintained therein.

Result is a precision flash-welding machine. This is the type of machine on which the tubing welds shown in Figs. 1 and 2 were made. Note that weld zone measures only 0.0004-inch (less than half a thousandth of an inch). Note, too, that original grain structure adjacent to the weld is not changed. Some slight cold working of the aluminum (darker section) has occurred from the hammer blow as evidenced by the more compact grain structure next to the weld. There is no internal flash on these welds.

Sufficient power is stored in high voltage condensers to permit welding parts up to ½-sq in. in cross section.

This means that the tubing up to about 2 inches OD in normal wall thickness can be welded by this method. Also extruded shapes in any cross section shape desired can be welded as long as the cross section area is less than ½-sq in. Of course, larger cross section can be handled by simply adding more capacitors.

By ELMER J. VANDERPLOEG
Assistant Chief Engineer
The Yoder Co.
Cleveland

Fig. 1—Typical outboard type roll forming machine for forming light, narrow shapes

. . . can be engineered for high productivity, low operating, maintenance cost

PART I

COLD ROLL forming is a process by which a flat strip of metal, by passing through a series of rolls arranged in tandem, is progressively formed into the ultimate desired shape. Ordinarily the metal requires no heating or heat treatment before, during or after forming. Number of rolls required is determined by the character and intricacy of the shape, also the thickness and kind of material to be formed. It is customary, where a number of different shapes are to be made on the same machine, to use one having a base long enough to accommodate the maximum number of rolls ever to be required for any shape likely to be made on that machine.

Machines—Because of the necessity for great accuracy and uniformity in most roll formed shapes, the machines as well as the tooling must be designed to very close tolerances. They must also be sturdy so as to withstand, for a period of many years, the bending stresses, wear and tear incident to continuous operation at a high rate of speed, in forming millions of feet of sheet and strip metal.

The typical roll forming machine consists of a welded steel base on which is mounted a series of two, three or more identical roll stands, each designed for holding one pair of rolls. For forming light, narrow shapes, the so-called outboard type machine is often used. In this the roll spindles are supported only at one end, affording better visibility and access to the machine in changing and adjusting the tooling. However, the pressures required in forming most commercial shapes are such that they impose on the spindles bending stresses which can best be withstood by supporting them at both ends in adjustable antifriction bearings. The latter also provide means of keeping spindles in accurate alignment. This is known as an inboard type machine.

The inboard type of machine, as made by at least

Fig. 2—View of a cold roll forming machine which is part of electric resistance weld tube mills for making pipe up to ¾-inch wall thickness and 20 inch diameter, from plate up to 63 inches wide

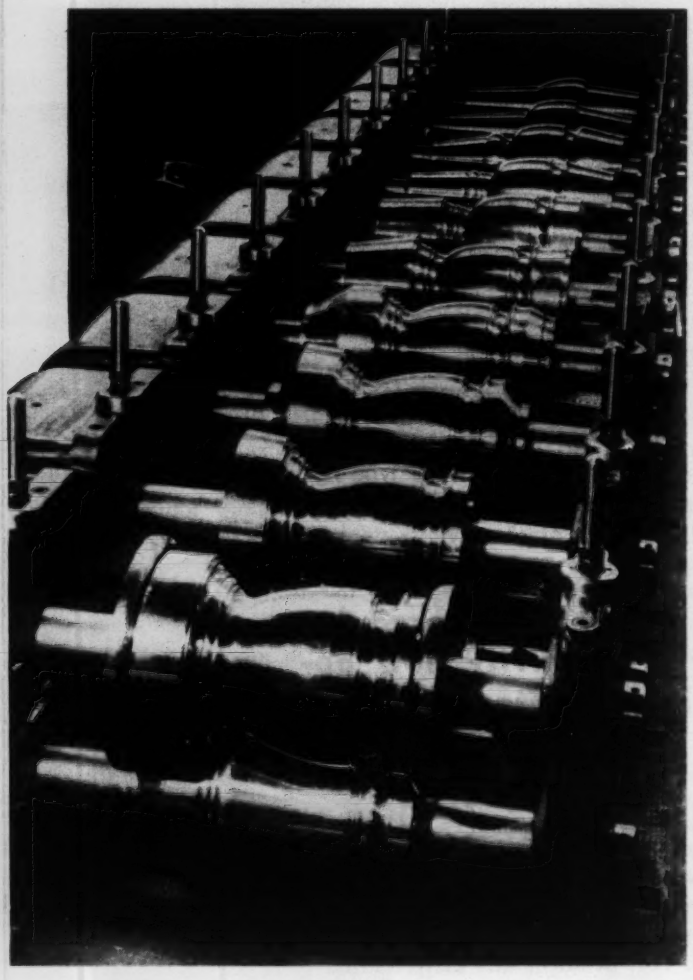

Fig. 3—Standard size roll forming machine with rolls for making the side and end section for burial caskets

one manufacturer, can be quickly converted to an outboard type, simply by pushing the outboard housings in against the rear housings.

The inboard type, being the machine most extensively used, has been standardized by one or two manufacturers in four basic sizes, for forming stock from 0.010 up to 0.156-inch thick and widths up to 16 inches. Simply by providing a wider base, these machines can also be used for widths up to 30 inches or more, although the capacity ratings in respect to stock thickness are thereby reduced due to increased liability to deflection of the spindles.

Fig. 2 is a view of a cold roll forming machine which is part of electric resistance weld tube mills, for making pipe up to ¾-inch wall thickness and 20-inch diameter, from plate up to 63 inches wide. Rate of production is from 40 to 60 feet per minute, depending on size. The welding speed here limits the forming speed. Annual productive capacity of such a mill, making a variety of sizes, will be about 180,000 tons on single shift operation.

Forming Bright and Precoated Stock—When roll forming is not to be followed by other operations, such as trimming and forming the ends, welding, bending, etc., it is common practice to use cut lengths or blanks and even coiled stock which have already been given the finish ultimately desired. As the change of profile between roll passes is limited, the

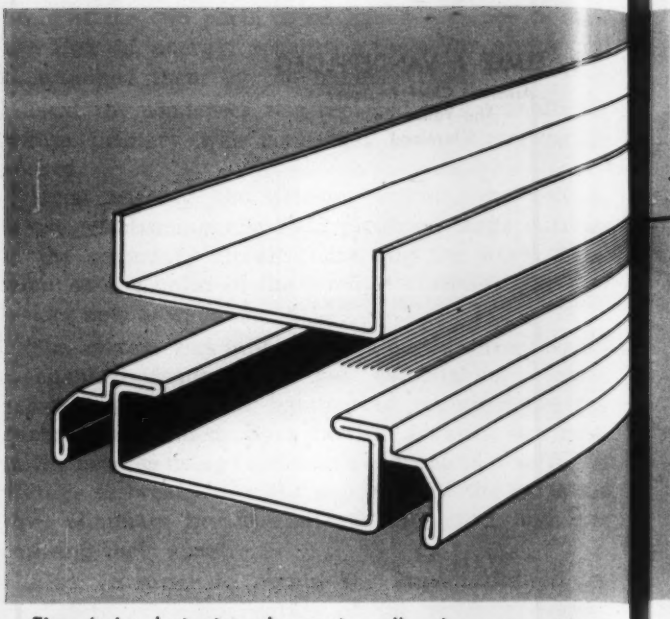

Fig. 4—In designing the main rolls, the open side section to be formed is generally made to face up; that is, the edges of the strip are bent upwards rather than down. When the profile is to have openings facing both up and down, the larger or most central opening is usually made to face up

roll pressures, in cold forming light gages of metal, are low enough to permit successful forming on a large scale of galvanized, electrogalvanized and electroplated stock. Metals which have been subjected to mechanical and chemical surface treatments such as buffing, polishing, burnishing, etc., may also be cold roll formed successfully without objectionable marring of the surface.

Hot dipped galvanized stock is being extensively used in cold roll forming, but is subject to greater limitations than are the other finishes just mentioned.

Ordinary paint, enamel, and other organic finishes are not well adapted to cold roll forming. However, in recent years, a number of organic coatings have been developed which will successfully withstand the stretching at sharp bends, as well as the pressures and wiping action of rolls used in cold forming. Progress is constantly being made along these lines to improve and broaden the use of organic coatings in cold forming applications.

Limitations in general apply to corner radii, depth of profiles and thickness of stock, but are sufficiently broad to permit the cold roll forming on a very large scale of metal trim, moldings, and building components. Invariable requirements are, however, that rolls must be accurately designed and ground, and their adjustment in the machine must be so accurate as to avoid excessive pressures resulting in scoring and other damage to the surfaces.

Tooling for Roll Forming—First and most essential in tooling for cold roll forming are, of course, the main, or driven, rolls, with the spacers for holding them in proper lateral alignment on the spindles. Fig. 3 shows a standard size roll forming machine with rolls for making the side and end section for burial caskets.

Depending on the character of the shape to be

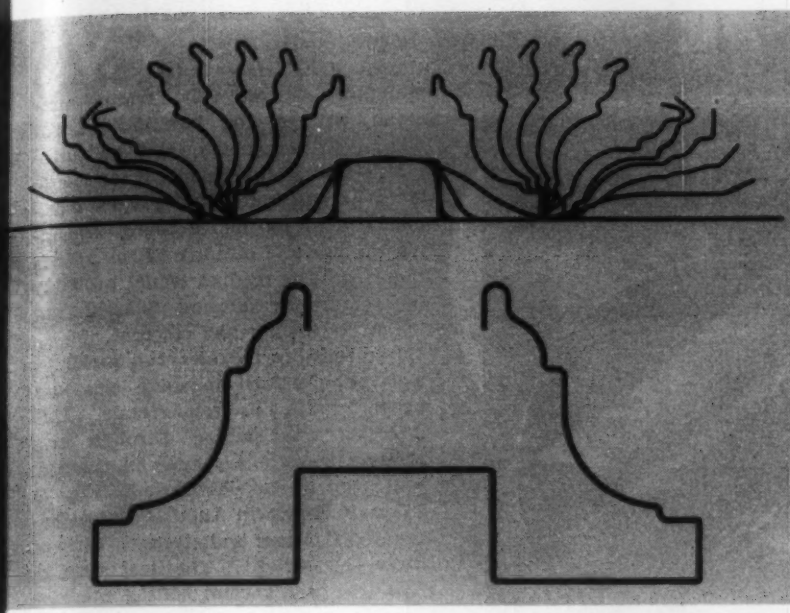

Fig. 5—As a preliminary to designing a set of rolls, a rough layout or "flower" of the successive roll passes is made, after first establishing a horizontal and a vertical guide line for developing the profiles from the flat strip to the finished shape

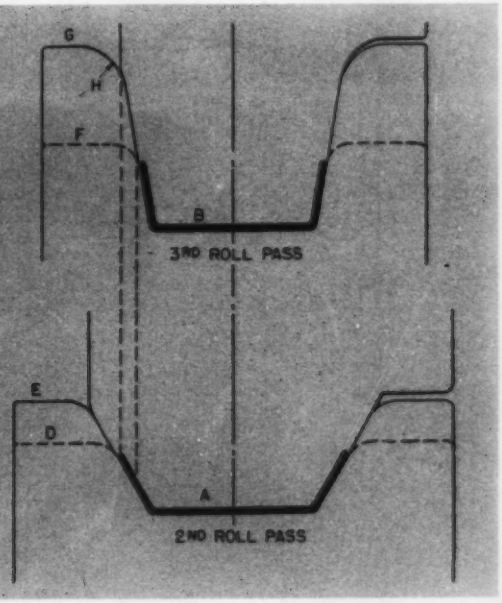

Fig. 6—Drawing illustrating change in profile of a channel between the second and third pass. Roll flanges prevent outside surfaces on both sides from being scored when pulled in against the edges of the lower rolls in the third pass

formed, there may also be a pair of entry rolls or a guide to keep the stock, as it is fed into the machine, in proper alignment with the first pair of forming rolls; also idler rolls, bar guides, or shoes for pinching in the edges and also to prevent vertical or horizontal deflection of the stock in its passage between successive roll stands. The idler rolls may also be designed to exert pressure from the sides, as an aid in forming the vertical surfaces of deep sections, such as channels and box shapes. Finally, at the exit end is a straightening guide, to prevent curving and twisting of the shape as it leaves the machine.

Small rolls or dies may also be provided for curving, coiling or ring forming; dies for cutting to length, perforating and notching the ends. These latter are mounted in an automatic flying cutoff machine installed in line with the forming machine. There may also be rolls for making lock-seam tubing; cutters for trimming stock to the exact width required; embossing rolls; in fact, a number of attachments with tooling may be provided for performing operations other than strictly roll forming, with little or no increase in labor cost or reduction of speed.

Number of roll passes is a question not only of tonnage or footage per day, but of producing shapes to close tolerances, freedom from waviness, curving, bowing, twisting, roll marks and other defects which may result in interruptions and delays for adjustments of tooling. Another consideration is that scrap and rejects are best avoided by having a sufficient number of roll passes.

Conversion cost of roll forming in most cases is only a small fraction of the original cost of the stock itself; hence even a small percentage of rejects alone may entirely wipe out the expected saving in conversion cost, not to mention the greatly reduced production per day. More severe bends can normally be made in the initial stages than in the final stages, for the final passes must bring the shape to its exact and final profile and insure against "springback." In fact, with springy stocks, slight overforming may be necessary.

All passes must be so designed that their surfaces are in contact with the largest possible area of the stock being formed, and so balanced between the left and right sides of the center line as to insure good traction and freedom from side pull.

Theoretically, the pitch diameters of the rolls are the same for all the passes, but as the strip elongates slightly and to a varying degree in passing through the rolls, the pitch diameters are progressively stepped up to a slight extent so as to maintain a satisfactory and uniform tension on the strip for traction purposes. This may be very important because if the traction should decrease between any two passes, the one pass would be pushing the strip forward faster than the next pass would be pulling it in, often resulting in buckling of the stock and interruptions of the operation for cutting off and removal of the buckled strip.

To aid in pulling in the edges of the strip in entering successive roll passes, and especially in the initial two or more passes, where most of the forming is being done, flanges must be provided on the female rolls. The dimensions and profiles of these flanges should be sufficient to prevent scoring of the outside surfaces of the stock as it is being forced in and downward in the lower or female rolls. Fig. 6 is a line drawing which illustrates the change in profile of a channel between the second and third pass, the outside surfaces on both sides would be scored in being pulled in against the edges of the lower rolls in the third pass unless these rolls were provided with

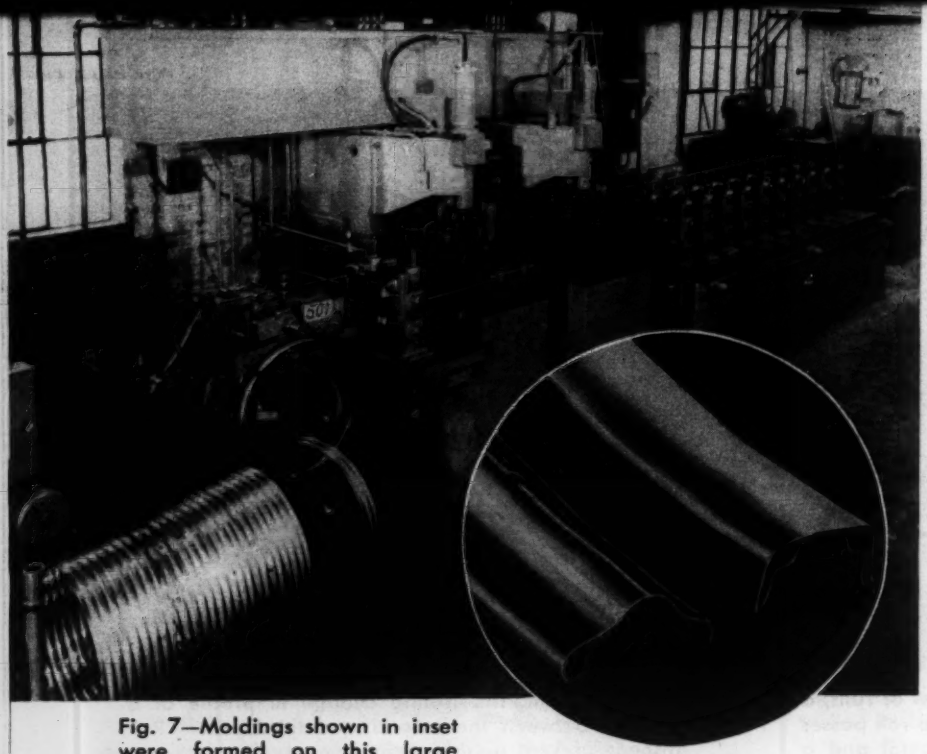

Fig. 7—Moldings shown in inset were formed on this large standard machine with ten roll stands. This molding was passed through two electric welders arranged in tandem to give the twin tubular shape increased stiffness and strength without increased weight

flanges as shown to prevent this from happening. Flanges are also designed to prevent excessive wear of edges of both upper and lower rolls.

Materials for Roll Manufacture—If relatively small quantities are to be produced of any given shape, and the profile is simple, without sharp edges and delicate contours, the rolls may be made of inexpensive machinery steel or semisteel, and hardening dispensed with. Such rolls may produce anywhere from a few thousand up to several million feet, depending on shape and finish of the section, and the material from which it is made.

For the longer roll life desirable in large scale production, hardened tool steel must have good machining quality, must harden to 60-63 Rockwell C, with a minimum of warping, and be capable of being ground and polished to a smooth surface. Using tool steel rolls on aluminum or brass stock, from four to five million feet are frequently obtained before regrinding is necessary.

When shapes are to be formed from hot rolled, unpickled steel, the rolls should be of high-carbon, high-chrome steel, so as to resist the abrasive action of the scaly surface of this stock.

Wide rolls are often made in sections, to the end that different parts thereof may be made of different materials, according to service requirements. For some parts of the profile an especially tough grade of metal may be chosen, while for others materials may be chosen for hardness or wear, or both. This split roll design also makes it possible to replace worn sections separately.

Split rolls are especially desirable for forming wide sheets in which flat areas predominate, such as V-crimp and similar roof sheets and siding; the flat parts of the rolls which do no forming may then be of soft steel, while hardened tool steel is used for those parts which do the forming.

In certain cases it is advantageous to chrome plate the rolls. This is generally done to minimize scratches and pressure marks on soft or precoated stock. However, high-carbon, high-chrome is recommended rather than chrome-plating, to avoid the necessity for replating every time the rolls require regrinding.

When hard-surface stock is used, or when the stock has an affinity for the rolls which may result in damage to the finish, bronze rolls are sometimes used to minimize the "pick-up." Life of bronze rolls depends on the shape and kind of stock used. When forming unpickled, scaly material, an extremely hard metal is required, while for forming cold rolled or stainless steel, aluminum or its alloys, it is advisable to use hard bronze or an alloy, such as No. 20 Ampco.

In order to prevent the guides from picking up surface particles, it is often advisable, especially in forming very soft metal, also to have the hardened and polished guides chrome plated.

Cost and Life—Initial cost of a standardized cold roll forming machine, with a coil box or reel for feeding the machine, and an automatic flying cutoff, motor and controls, ranges from about $10,000 minimum up to $50,000 or more, depending on size and number of roll stands required. The median would probably lie somewhere around $25,000, not including tooling and die cost.

For forming bicycles rim moldings a large standard machine size was needed, with 10 roll stands. This molding was passed through two electric welders arranged in tandem, as shown in the photograph (Fig. 7) to give the twin tubular shape increased stiffness and strength without increased weight. The last unit in this line is a special coiling machine combined with an automatic cutoff. These machines were both adjustable so that rims ranging from 20 to 26-inch diameter may be obtained within a circumferential tolerance of 1/16-inch.

As to life of machines, there is practically no limit, and maintenance including replacements, is small or negligible even in a very old machine, so long as it is not being abused. Wear and replacements of rolls and dies are the principal items of expense. In the majority of applications, 3 or 4 million feet can be produced before regrinding is necessary, and several regrindings can be made before ultimate replacement.

Speed and Economy—Standard roll forming machines are usually equipped for a constant speed of 100 feet per minute, but may be designed for a higher or lower speed to meet special requirements. Allowing for avoidable and unavoidable delays during working hours, the daily production at this speed will average about 30,000 lineal feet. This may, but seldom is stepped up by end-to-end welding of successive coils to avoid the slight loss of time incident to the starting of each new coil through the machine. For most applications, the daily production even without continuous feeding, is so great as to exceed requirements. In fact, many machines are operated only a few days per month, yet are highly profitable.

Generally speaking, if cold roll forming can be used in shaping any product the conversion cost will be low. Reduction in weight frequently obtainable by taking a flat strip of metal and forming it into box, channel, tubular and other hollow shapes to obtain the highest strength-weight ratio is also important.

(To be concluded)

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FUNDAMENTALS of STEELMAKING

NUMBER 24 OF SERIES

Another in a continuing series of articles on the making of steel and finishing it into products ready for the consumer. Each article is written by an outstanding authority in his particular field.

PRODUCTION OF

Semifinished Steel

Description and operation of three-high blooming mills, slabbing mills, and both types of billet mills are herein presented together with a discussion of surface conditioning of blooms, slabs, and billets

By KARL L. FETTERS
Special Metallurgical Engineer
and
H. H. HOTTEL
Metallurgical Engineer
The Youngstown Sheet & Tube Co.
Youngstown

PART III

THREE-high blooming mills, as the name implies, have three rolls, arranged one above the other, as shown in Fig. 13. The rolls always revolve in the direction as shown by the arrows in the sketch and it is not necessary to reverse their direction as is the case on reversing blooming mills. For certain purposes, this type mill has some advantages over the two-high reversing mill principal of which are smaller and less costly motive power and greater production. Since the rolls revolve continuously in the same direction, a heavy fly wheel is applied to the driving shaft enabling the use of lighter and lower powered motors. Also, since the number of passes on the three-high mill is considerably lower than on a reversing mill and as two or three pieces may be going through a three-high mill simultaneously, production or capacity of three-high units is much greater than on reversing mills of the same size. Disadvantages of the three-high mill are its smaller amount of reduction and limited number of sections which can be produced on any one mill or set of rolls. Amount of reduction is limited by the fewer number of passes available on this type of mill and inflexibility of the number of sizes is due to the same reason. In fact, most three-high mills are intended to produce only one size bloom on any one mill.

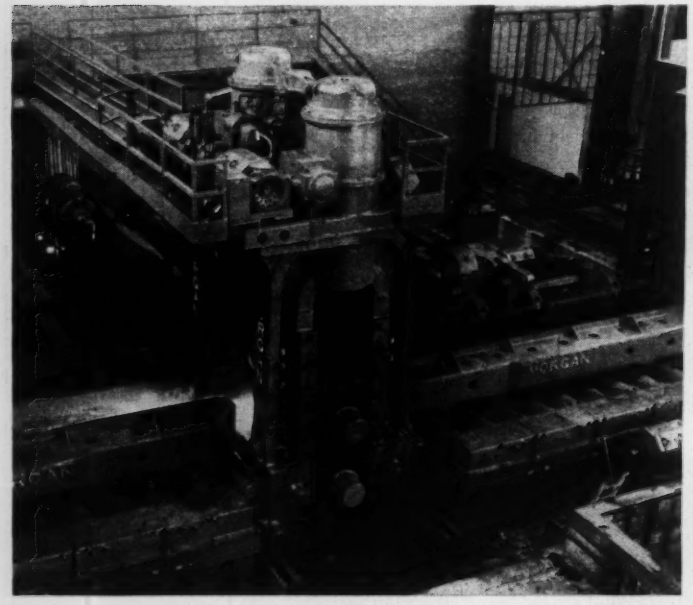

Fig. 11—Two-high 40-inch reversing blooming mill with twin motors. Courtesy Morgan Engineering Co.

Although the three rolls of any one mill are the same length, the diameters are slightly different. The bottom roll is the largest; the top roll is the smallest; and the middle roll is of an intermediate size. The bottom and middle rolls usually have five grooves or passes of various widths and depths distributed from one end to the other. The grooves on the middle roll must serve for both the lower and upper passes. Grooves on the top roll are of the same width as those immediately below on the middle and bottom rolls, but the groove depths are less on the top roll, so that the section is reduced in thickness when it is passed through the top groove.

When a hot ingot is delivered to a three-high mill, it is made to enter the first groove or pass between the bottom and middle rolls, which reduces its thickness. After it reaches the other side of the mill, a lifting table raises the section so that it may be passed back through the upper groove located between the top and middle rolls. The table then lowers the section, turns it 90 degrees and moves it into position for a third pass between the bottom and middle rolls. These back and forth operations are continued through all of passes contained in the rolls. Majority of the three-high blooming mills have seven to nine passes. As a typical example, a 21 x 23-inch ingot may be reduced to a 9 x 10-inch bloom in nine passes on a 42-inch three-high mill. Only blooms or large billets are rolled on three-high blooming mills as this type unit is not adaptable for rolling slabs. After leaving the finishing pass, blooms are cut to the desired length after the required discard has been sheared off, and if additional reduction is required are delivered to a billet mill for further rolling to a smaller

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size, usually without any intermediate heating operations.

Slabs are produced for the rolling of plates, sheets and strip. As mentioned during our description of two-high reversing blooming mills, slabs may be rolled on either a two-high reversing or a slabbing mill. Although considerable slab tonnage is rolled on two-high reversing mills, the size of such slabs is limited to the maximum roll spread since it is necessary to edge roll the slabs near the last passes. Therefore, width of slabs rolled on a two-high reversing mill is usually limited to about 45 inches. In order to produce wide and heavy (thick) plates, it is necessary for such plants to have slabbing mills for rolling wide slabs.

Slabbing mills are modified types of universal mills, and consist of one set of four horizontal rolls and one set of four vertical rolls. As shown in Fig. 14, the horizontal rolls are of sufficient length to provide for the maximum width of slab required with the vertical rolls providing the necessary edge rolling on the slabs. It is not necessary to turn the slab on edge as is the case on two-high reversing mills, thus, material is always in a flat position in passing through the mill.

Each slabbing mill consists of a four-high stand of horizontal rolls and a stand of four vertical rolls which are usually placed 8 to 10 feet in front of the horizontal rolls. Each stand of rolls is driven independently and each is reversible. Both stands are of the four-high type in which only the two inner rolls actually come in contact with the steel being rolled, while the two outer rolls are used as reinforcing or stiffening rolls. Four rolls are used to provide the great strength necessary in the rolling of large slab ingots.

The horizontal part of the mill is operated in the same manner as the two-high reversing mill, except that the rolls are plain and not grooved and the piece of steel is passed back and forth through the rolls in the same relative position.

Fig. 12—Two-high 36-inch reversing blooming mill. Courtesy Morgan Engineering Co.

REPRINTS AVAILABLE

REPRINTS of previous individual chapters in the series "Fundamentals of Steelmaking" now may be obtained by addressing Readers' Service Department, STEEL, 1213 W. Third St., Cleveland 13, O. Prices range from 20 to 75 cents per reprint. Subjects covered in previous issues include:

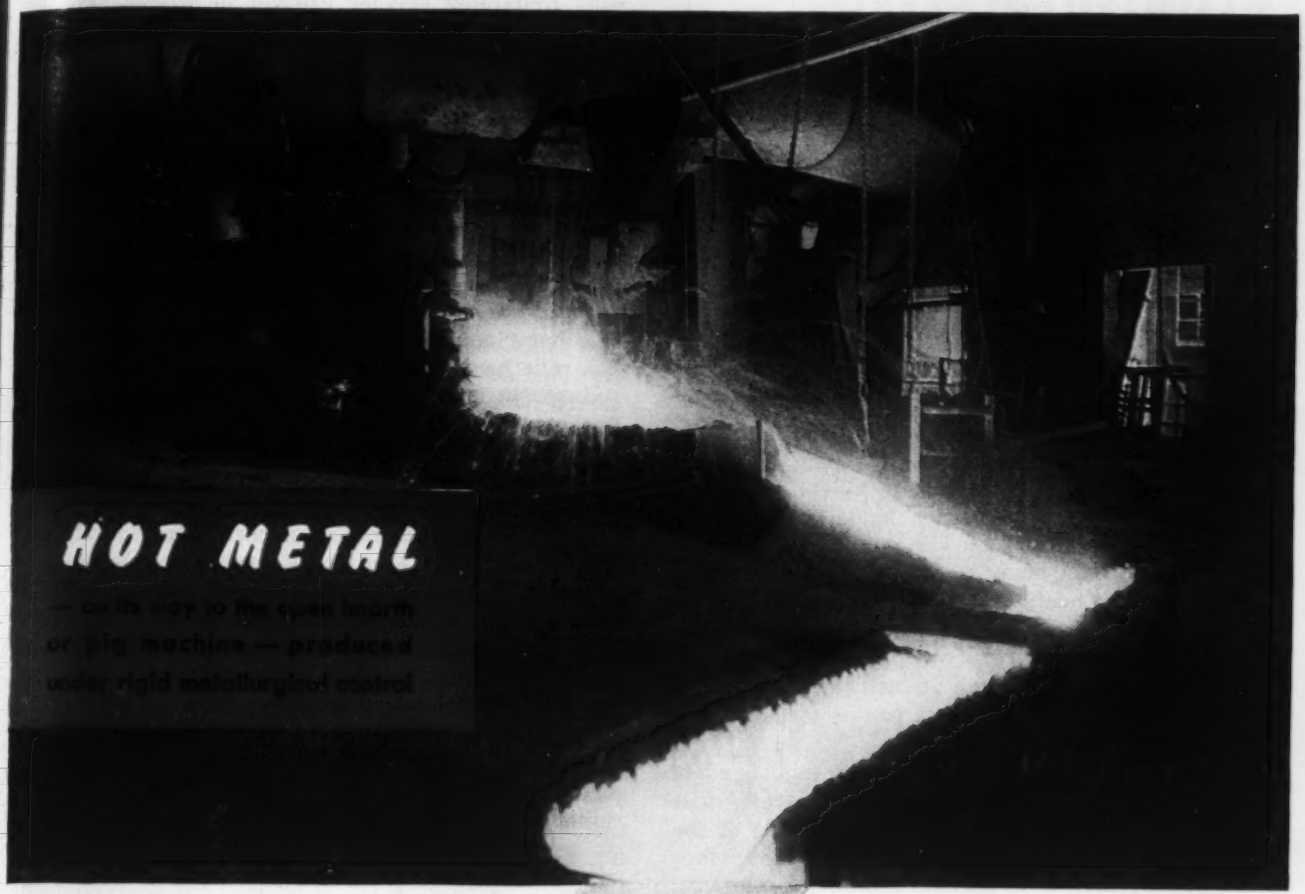
No. 1, Production of Electric Arc Furnace Steel; No. 2, Scrap Iron and Steel; No. 3, Production of Open Hearth Steel; No. 4, Production of Tool Steel; No. 5, The Art of Roll Pass Design; No. 6, Production of Bessemer Steel; No. 7, Production of Metallurgical Coke and Resultant Coal Chemicals; No. 8, Production of Plates; No. 9, Production of Hot and Cold-Rolled Strip and Sheets; No. 10, Production of Tin Plate; No. 11, Production of Structural Shapes and Rails; No. 12, Production of Butt and Lap Welded Pipe, Conduit and Electric Metallic Tubing; No. 13, Production of Pig Iron; No. 14, Production of Seamless Steel Pipe and Tubes; No. 15, Production of Stainless Steel; No. 16, Iron Ore—Its Mining, Beneficiation and Reserves; No. 17, Transportation and Handling of Iron Ore; No. 18, Production of Wire and Wire Rods; No. 19, Production of Gray Iron Castings; No. 20, Production of Steel Castings; No. 21, Production of High Alloy Steel Castings; No. 22, Production of Wrought Iron; No. 23, Production of Forgings.

In the vertical portion of the mill, the two inner rolls also act as contact rolls and the two outer rolls are back-up reinforcing rolls. Vertical rolls are of sufficient length to provide for the greatest thickness of the piece being rolled and are slightly longer than the maximum spread between the horizontal rolls. Vertical rolls are usually much smaller in diameter than horizontal rolls. On a large slabbing mill, diameter of the vertical rolls may be about 18 inches, and of horizontal rolls 26 to 34 inches.

Horizontal rolls are driven by reversing steam engines or electric motors. Vertical rolls are driven by a separate reversing engine or motor. On one slabbing mill built in 1939, each of the two contact or working horizontal rolls is driven by a separate electric reversing motor. This eliminates the necessity for complicated pinions and driving gears required when one motor drives both rolls. On horizontal rolls, only the two inner or contact rolls are power driven while the two outer reinforcing rolls turn by friction with the rolls in which they are in contact. In the case of vertical rolls, all four are usually driven by a set of gears connected with the motor drive shaft.

Vertical rolls are not intended to produce too much reduction in the rolling of slabs, since width is not usually reduced more than 1 inch during all the reduction passes. Therefore, most of the reduction is brought about by the horizontal rolls which reduce the thickness every time the section is passed through the rolls. After the first few passes, spread of the vertical rolls is adjusted to produce only sufficient pressure on the slab edges to prevent their tearing and to insure the proper slab width. The vertical rolls also permit a heavier reduction by the horizontal rolls on the backward passes, since the vertical rolls aid in pulling the slab through the horizontal rolls. During forward passes, the vertical rolls cannot help the horizontal rolls much, since theirs is a pushing rather than a pulling force.

Some of the larger slabbing mills are capable of rolling ingots weighing up to 45,000 pounds into



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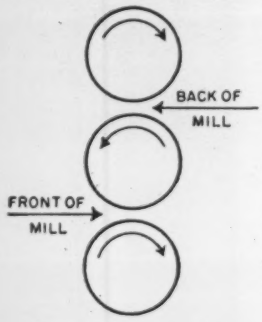


Fig. 13—Diagrammatic arrangement of a three-high blooming mill showing direction of roll rotation

slabs as large as 60 inches in width by 8 inches in thickness and 20 feet in length. Slabbing mills are not suitable for rolling blooms or billets.

Amount of draft or reduction made in each pass through the horizontal rolls varies and is dependent upon grade of steel being rolled, ingot temperature, uniformity of the heating of the ingot, and the ingot's size and shape. As a general rule, thickness of the section being rolled is reduced from ½ to 1-inch in each pass. Thus, in rolling a 26-inch thick slab ingot to a 6-inch thick slab, 21 to 25 passes would be required.

In rolling hot and therefore scaled ingots, some means must be employed to remove the scale as it becomes broken from the ingots by the action of the rolls. If not removed, it will be rolled into the surface of the slabs resulting in surface pits or indentations. The method used for removing scale varies somewhat with the grade of steel being rolled. In rolling low and medium carbon steels, water under high pressure and salt are used. Scale adheres more firmly on high carbon and certain alloy steels, so old burlap, coal or green twigs may be employed. With any of the methods mentioned, the substance used is drawn under the rolls and brought into contact with the hot steel. This results in a violent gas action which in its escape carries away the scale.

After the finishing pass, the slab is conveyed to a large shear where any injurious piping is sheared-off and discarded, after which the slab is cut to the required length.

As stated previously billets are square or rectangular sections, with rounded corners, of 36 square inches or less in cross-sectional area. Smallest size section within the billet classification is a 1½ x 1½-inch square. Although it is possible to roll billets as small as 4 x 4 inches square on some reversing blooming mills, it is not practical to do so, since it requires much more time and thus decreases production to such an extent that the mill cannot roll its required tonnage. Therefore, it is customary for steel plants to place some type of billet mill immediately after the blooming mill for the purpose of rolling hot blooms into billets, usually without additional heating.

There are two general types of billet mills; namely, three-high and continuous units. Three-high billet mills operate on the same principles as the previously described three-high blooming mills, although they are of less massive construction employing rolls containing smaller grooves or passes. For example, in one plant the three-high blooming mill is a 38-inch unit and the three-high billet mill a 28-inch unit. The former rolls 9 x 10-inch blooms which are delivered to the three-high billet mill on which the blooms can be further rolled into billets of 4 x 4-inches and larger.

Continuous billet mills, often referred to as Morgan mills, consist of a number of horizontal two-high roll stands arranged in a straight line one after the other. Number of stands varies somewhat from mill to mill, but nine or ten stands are usually employed. The hot bloom enters the first roll stand, containing the rolls having the largest grooves, where it is both reduced in cross-section and elongated. The reduced section is automatically entered, by steel guides, into the smaller grooves of the next roll stand, and so on until the section leaves the last stand having been reduced to the finished billet size. It should be noted that the travelling section passes through each set of rolls (roll stand) only once, however, it also may be passing through several roll stands simultaneously. For this reason, rolls must be driven at different speeds in each stand; the first stand being the slowest and the last one the fastest, to accommodate for elongation resulting from each preceding pass. The rolls in all of the stands are usually driven by one engine connected to a large drive shaft running the entire length of the mill. Opposite each stand a miter gear is placed on the drive shaft which meshes with another miter gear placed on a shorter shaft, at right angles to the main drive shaft, which leads to and drives the rolls in that particular roll stand. Variation of roll speeds in the different stands is obtained by changing the gear ratios.

In order to provide equal amounts of work on all four sides of the section being rolled, it is customary to twist the material 90 degrees between every other set of rolls. Special steel guides are used for this purpose and are built and adjusted to give the desired amount of twist and properly guide the piece into the next set of rolls.

Since 1940, some continuous billet mills have been improved by the addition of two or three sets of vertical rolls, each set being located between the first few stands of horizontal rolls. Use of vertical rolls eliminates the necessity for twisting the piece between the horizontal stands, and aids in effecting more uniform work on all four sides of the piece and reduces rolled-in laps on the product's surface.

Since the rolls used in continuous billet mills are comparatively short, they need not be very large in

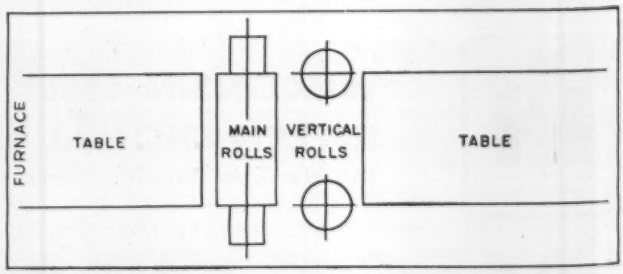


Fig. 14—Diagrammatic arrangement of a slabbing mill showing position of roll sets

diameter. On an average size mill, overall length of the rolls is about 5 feet with a diameter of approximately 12 to 15 inches. Although the rolls in the first two or three stands usually have only one groove, those in succeeding stands may have two or three adjacent grooves of equal shape and size. Although only one groove is used at any one time, the additional grooves can easily be used by adjusting the guides after the adjacent groove becomes badly worn. In this manner roll life between changes is doubled or tripled. It is not necessary to change rolls in order to roll different sizes on most continuous billet mills. The size of the groove in the rolls of the last stand is the same size as the smallest billet which the mill is required to roll. The groove in the rolls of the next to the last stand is somewhat larger and equal in size to the next larger size billet commonly rolled. When rolling the larger billet, the rolls of the last stand are opened sufficiently to allow the larger billet to pass between them without receiving any further reduction. In this manner, it is possible to roll two or three different sizes of billets on the same mill without changing rolls. In other words, the various sizes of billets require the use of a different number of stands or the larger the billet being rolled, the fewer the number of stands actually used.

On a common size continuous billet mill, a bloom about 7 x 8 inches in section is delivered to the mill where it may be rolled into various sizes of billets ranging from 1½ to 4-inch squares. The bloom is usually in one piece being the full product of one ingot after the required discard for piped steel is made. As the bloom passes through each stand, the resulting elongation causes an increase in the delivery speed from each consecutive stand until a speed of 400 to 500 fpm may be reached upon leaving the last finishing stand. Since the finished billet is many times longer than the original bloom, it is necessary to shear it to the proper length for handling as it is delivered from the last stand or while it is still traveling at a comparatively high rate of speed. This is accomplished by the use of flying shears. Flying shears are so named because they must be capable of traveling in the direction of the rapidly moving billet, while their blades are engaged in the shearing operation, in order to prevent the billet from buckling. Such a shear is built on a rolling table and as its blade engages the billet, it moves forward several feet until the blade is disengaged, after which the shear returns to the original position and is ready for the next cut. This type shear is operated automatically by a trigger placed at the proper distance in front of the unit. When the front end of the billet hits the trigger, the shear immediately cuts the billet to the required length. Length is adjustable by varying the distance between the shears and the trigger.

In order to keep the billets as straight as possible, they are conveyed after shearing to large flat cooling beds, spread out in a single layer, and allowed to cool before being placed in bundles or cars.

Even under the most favorable mill practices and rolling conditions, it is impossible to roll blooms, billets and slabs which are always free from surface defects, such as seams, slivers, laps and cracks. After the rolled products are inspected, any apparent surface defects are marked and subsequently removed by chipping, scarfing, grinding or machining. Their removal by any of these means is known as surface conditioning. The amount of care used in the inspection and removal of surface defects depends upon the quality of the product being produced and requirements of its end use. Usually inspection of the product is made in the as-rolled condition at which time the surface generally is covered with a thin film of scale or oxide which tends to obscure some of the smaller defects. Therefore, on some products requiring an especially good surface, scale may be removed by pickling the sections in hot acid before inspection and surface conditioning. In this pickled condition, surface defects are more readily apparent.

Chipping is the most common method of surface conditioning used today. In this method a chisel is inserted in a pneumatic hammer which is pressed by hand against the surface being conditioned. In this manner, both the depth and direction of the chipping operation can be controlled.

Scarfing is the term applied to the method of surface conditioning by use of an oxyacetylene torch. It may be performed by hand torches or by automatic scarfing machines. The latter actually flame cuts a thin skin from all surfaces of the bloom.

Grinding is usually done with motor driven grinding wheels, and is satisfactory only for the removal of very shallow defects.

Some special surface conditioning machines are used which machine a thin layer of metal from the entire surface of round sections such as tube rounds used for making seamless pipe.

Depth of surface conditioning for blooms or billets usually is limited to 1/16-inch for each inch of sectional thickness up to a maximum depth of ¾-inch. Width of the conditioning must be at least four times its greatest depth. A depth of 3/32-inch per inch of thickness is permitted on the wide surfaces of slabs.

Shovel Crane Will Not Stall

SHOCK-absorbing hydraulic coupling which prevents stalling of the engine due to any digging circumstances and provides a means of absorbing digging stresses and strains is incorporated in the design of the Lorain-50 power shovel-crane, introduced by Thew Shovel Co., of Lorain, Ohio.

The coupling is equipped with a plate clutch "de-clutcher" to permit stopping the machinery without stopping the engine. Other features include a Timken roller bearing equipped turntable, floating anchor shoe type swing clutches, four crawlers of various widths and lengths and ability to function as shovel, crane, clamshell, dragline or hoe.

Really Gets Around

A FEATURE valuable to those plants having scattered stockpiles is a 15 mph road speed of the pneumatic-tired model 543 bucket loader, made by Barber-Greene Co., Aurora, Ill. Truck type of worm and roller steering is said to allow easy maneuverability in cramped places.

Furnacemen Stress Importance of

ORE BENEFICIATION PRACTICES

Metallurgists search for method of titanium separation which if found may unlock new iron ore deposits. Production of iron-bearing pellets by vacuum extrusion holds promise. Faster charging of open hearths made possible by direct hoisting of boxes from cellar to charging floor

TWENTY-FIVE years ago, individuals from 21 independent steel companies gathered in Pittsburgh at the request of J. V. W. Reynders, a distinguished consulting engineer, for the purpose of exchanging ideas on open-hearth practice. This was the beginning of the present National Open-Hearth Committee of the American Institute of Mining & Metallurgical Engineers. Two years later L. F. Reinartz, assistant vice president, Armco Steel Corp., Middletown, O., was elected chairman of the committee and tribute is paid him for his unstinted devotion in guiding this association of steelmakers to its present position of high esteem in which it is held.

The silver anniversary conference of the National Open Hearth Steel Committee and the Blast Furnace, Coke Oven and Raw Materials Committee held at the Netherlands Plaza Hotel, Cincinnati, April 10-12, was stamped with marked success. It opened with a bus ride to Middletown, O. and a tour through the East Side Works and the electric furnace department of the Armco Steel Corp. plant and continued for the following two days with a presentation of an array of technical papers which kept the attendance at sessions at top level.

H. M. Griffith, works manager, Steel Co. of Canada, Ltd., Hamilton, Ontario, was elected chairman of the National Open Hearth Steel Committee. A. H. Sommer, superintendent of steel mills, Keystone Steel & Wire Co., Peoria, Ill., is the new vice-chairman of the committee. Next year's conference will be held at Hotel Statler, Cleveland, April 2-4.

Ore Reserves—"An Appraisal of the Iron-Ore Resources of the World—An American Estimate" by J. W. Gruner, University of Minnesota, Minneapolis, Minn., was one of the many important papers presented at the Blast Furnace, Coke Oven and Raw Materials session. A digest of this paper was presented in last week's issue of STEEL, page 47. Comments on this paper brought out the following facts.

If high-grade ore is found in the Labrador deposits, it will be located in spots. Old range ore in Michigan will not increase in production over the years ahead but will maintain the production of high-grade ores for a number of years to come. About 1/6 of the area in Ironton, Mich., is yet unexplored. Not a drill hole has been sunk in this particular area where there may be a vast tonnage locked up. It was brought out that in eastern United States iron ore deposits are greatly overestimated. There are deposits of 25 per cent iron of a million tons or so but the mining district as a whole is rather small. The problem of transportation must be solved if we are to depend on foreign countries as an ore supply. One large steel company is working on a method to separate titanium from titanium-bearing ores and one important authority pointed out that if the titanium problem is solved millions of tons of iron ore deposits will be opened up just across the Canadian border. In the Yunnan Province, China, there is a deposit that could run into millions of tons of ore. It also was voiced that the United States shows far better potentialities in iron ore than does Russia.

The paper on "Pelletizing of Iron-Bearing Fines by Extrusion" by P. E. Cavanaugh, assistant director, department of engineering and metallurgy, Ontario Research Foundation, Toronto, also commanded interest of blast furnacemen. The speaker pointed out that in conducting tests on a rich specular hematite it became apparent that production of a satisfactory pellet did not depend only on the method of making the pellet. During heating and reduction trials, a 1-inch cube of this ore was found to swell so that its effective volume increased by about 40 per cent. Any ore which swells a great deal during heating and reduction is not likely to produce a satisfactory pellet if the screen-size distribution tends toward maximum density.

In describing the operating parts of a vacuum extrusion machine, the speaker brought out that the feed to the machine comes from a pug mill or other premixer where the required amount of moisture is added to impart plasticity to the mix. It passes into the feed end of the extrusion machine and is forced through a die and then through a shredder into the vacuum chamber. Air is removed from the mix in the vacuum chamber and the material then flows into another screw feed, which forces it under high pressure out through the die at the end of the machine.

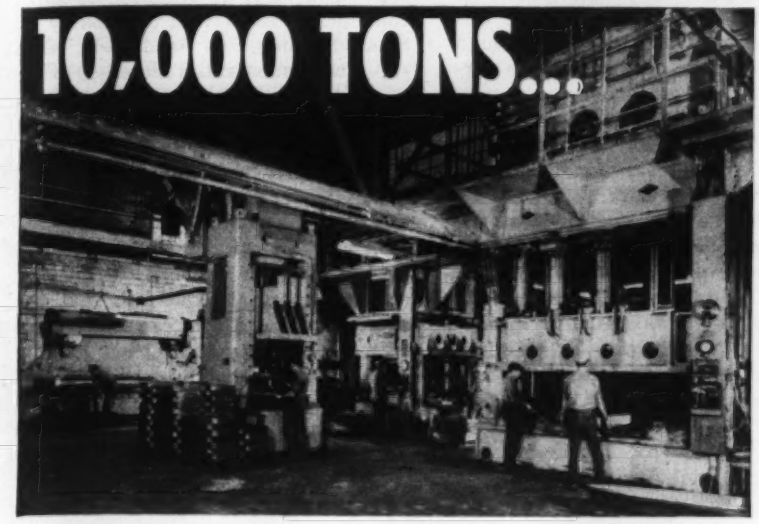
Removing Air—"De-airing" or evacuation of the material, the author explained, is a very important step in this process. If the air is not removed, it is enclosed in the ore under pressure and as the extruded column emerges from the die the air will expand and crack or shatter the column. The speaker pointed out that most iron ores are difficult to extrude without using vacuum extrusion technique.

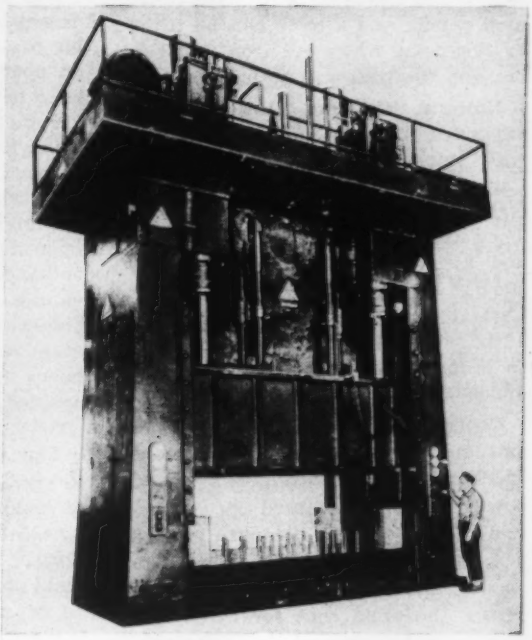
The author mentioned that commercial sizes of extrusion machines can extrude up to 50 tons per hour of iron ore. A pellet 3 inches in diameter is about the largest practical size though pellets 1 or 2 inches diameter in the shape of a cube with rounded edges are recommended. Production costs for an extrusion plant producing 50 tons of pellets per hour from ore or mixed ores without a binder is about 33 cents per ton; using a binder the total production cost is approximately $1.01.

Pig machine wheels made of tool steel have been found to far outlast anything else according to A. J. Macdonald, Hanna Furnace Corp., Buffalo. He explained that the first

METAL STAMPINGS

10,000 TONS...

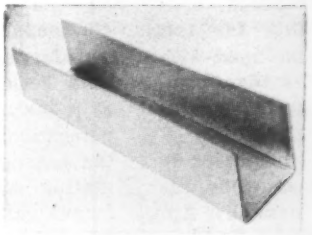




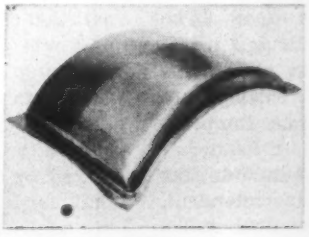
Above, *left to right: Dreis and Krump Press Brake, ¼" x 120" capacity; 750 ton single action Williams-White hydraulic press, 60" daylight opening, bed area 48" x 96", equipped with hydro-pneumatic cushion; 2500 ton single action Lake Erie hydraulic press, 48" daylight opening, bed area 120" x 59" equipped with spring cushion; 750-250 ton double action Marion hydraulic press, daylight opening 69", bolster area 120" x 60", equipped with hydraulic cushion.*

Right: *Triple action Clearing hydraulic press, 750 ton ram capacity, 400 ton blankholder, 350 ton 3rd action, bolster area 150" x 72", daylight opening 94", stroke of ram 66", equipped with hydro-pneumatic cushion.*

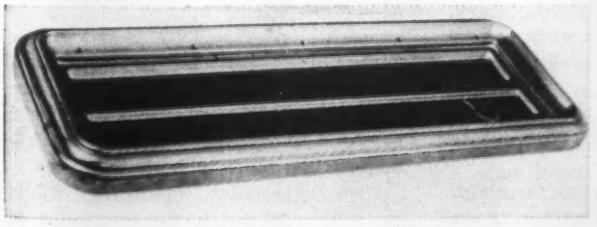
½" thick x 39⅛" long x 8⅜" wide x 9⅜" deep. Weight 125 lbs. ➤



20 gauge x 46" long x 42" wide x 10" deep. Weight 22 lbs. ➤



18 gauge x 83" long x 28" wide x 4" deep. Weight 75 lbs. ➤



These giant presses are just a few of the many modern production machines at the Leake Stamping Company. Also available are numerous medium sized and small, high speed presses as well as complete supplementary facilities for heat treating, brazing, welding, carburizing, machining and testing. Equally important, Leake engineers are widely experienced in solving tough pressed metal problems, often involving the complete redesign of parts previously made by other production methods to adapt them to pressed metal fabrication.

This valuable experience is available to you for the asking. If you have parts that you feel might be made better or more economically from pressed metal, send samples or drawings to Leake engineers. They will investigate the possible advantages of the use of pressed metal in your particular problem. If pressed metal cannot readily be applied to your particular part, they will be frank in telling you so. If, on the other hand, your part is applicable to this modern production method, Leake will be glad to design and furnish quotations covering your requirements.

THE LEAKE STAMPING COMPANY, MONROE, MICHIGAN

LEAKE

EXPERTS IN PRESSED METAL

COMPLETE PRESSROOM—MACHINE SHOP
HEAT TREAT—BRAZING—WELDING
TESTING AND INSPECTION

tool steel wheels were installed eight years ago and are still good for many more years. On each pig machine a ladle skimmer has been installed at the end of a structural steel beam of rugged design. This skimmer is counter-weighted and raised and lowered by a hand-operated winch, and a ladle can be tilted to the point where all iron will run out and the kish still be held back.

Uniform Thickness Best—It was explained that a mold of uniform wall thickness was found superior. Carbon molds have been tried with eight molds installed in one strand. They were used for a couple of weeks and at the end of that time they showed no signs of wear or burning. Carbon molds have a future, the author believes, but adapting them to a machine already built for iron molds would be difficult.

Control of the mold coating is of extreme importance, according to the speaker. Dead-burned dolomite and powdered coal are used in proportion of 75 per cent dolomite and 25 per cent coal by volume. One man on day turn only takes care of preparing the mold coat for three machines for 24 hours. Mold coat is asperated into the molds with a jet of steam from the tanks beneath the machine. Pouring temperatures on standard iron range from 2400 to 2600° F. The speaker explained that there are some occasions when better looking iron will result if the temperature is allowed to go down a little, but as a general rule the hotter the iron when poured, the better looking the pigs.

A cross section of the steel industry indicates that there is no correlation between the consumption of oxygen and increase in production. It also appears to be the general consensus throughout the steelmaking industry that oxygen for flame enrichment cannot be used economically with existing shop facilities because of the difficulty of getting furnaces charged rapidly enough to take advantage of the faster meltdown which is achieved by the use of combustion oxygen.

A study was made at the plant of the Inland Steel Co. to determine whether or not any beneficial results in the way of sulphur removal were obtained by the use of oxygen for decarburizing. It was found that during decarbonizing sulphur was removed at the rate of 0.0002 per cent per minute as compared to a removal rate on normal heats not using oxygen of 0.0001 per cent per minute, indicating that the rate of sulphur removal is greatly accelerated. The study further indicated that as much sulphur could be eliminated by normal working practice as could be eliminated when oxygen is used, but with a loss of operating time.

A charging practice described by V. W. Jones, open hearth superintendent, Armco Steel Corp., Middletown, O., is unique. Loaded charging boxes are hoisted by crane from the cellar of the open hearth shop through an opening near one end of the furnace to the charging floor where they are picked up by the charging machine and handled in and out of the furnace; empty charging boxes are returned to the cellar through an opening in the charging floor at the opposite end of the furnace. One box is handled every two minutes. Advantages of this method are that the stockyard can be operated at a more even rate, the efficiency of the furnaces increase and charging delays avoided thus resulting in better fuel efficiency.

Tar Coating—Tar appears to be the best material for coating interior of molds. This fact was brought out by Harold Walker, Republic Steel Corp., Warren, O., in speaking on mold coatings. In describing a method of coating molds at these plants the author stated the mold is positioned on a table located in a pit filled with molten tar. Steam coils are employed for heating the tar. Scrap is removed from the mold with a spade and bar and is then positioned on the table. Tar at a temperature ranging from 150 to 200° F fills the mold through a height of 80 inches in 15 seconds. Meanwhile, the mold stools are cleaned manually. Approximately 1000 gallons of tar is used in the pit twice a week. The advantages of this particular method are that the human element is eliminated, no mechanical delays are encountered and the mold temperature is controlled.

In an endeavor to eliminate tar fumes, J. J. Golden, superintendent, steel production and central mills, Carnegie-Illinois Steel Corp., Gary, Ind., explained that they are now working with materials known as Darmold and Hydropaste. Comparative cost ratio of mold coatings are tar 1.00, graphite 1.25, Hydropaste 3.333, and Darmold 5.00.

Refractory throwing guns for maintaining open-hearth furnaces have wide application based upon the comments of various steel operators. Some of the applications are as follows: Repairing backwalls, back jams and monkey walls; building the panwall by injecting material through the endwall; shooting metal mixers between campaigns; and spotting heavier materials in deep holes in different parts of the furnace.

In reporting on the progress of an all-basic furnace, A. K. Moore, open-hearth superintendent, Steel Co. of Canada, Ltd., Hamilton, Ontario, pointed out that considering other possible advances in operating methods and technology, which may increase tonnage with less expensive roof refractory, he hesitated to stake too much in the saving effected by increased tonnage on fixed costs, when faced with substantial increases in the cost of refractory and fuel. In the speaker's opinion, the basic roof operations must prove itself by equalizing or nearly equalizing the sum of these two costs with silica roof operations.

In working with higher firing rates on the all-basic furnace, the speaker drew attention to the fact that the firing rates on furnaces at his plant with silica roofs have been steadily increased, and that by adjusting furnace operating practice the plant has been able to employ firing rates during the present years under the silica roofs, which are at the present limits of our fuel and furnace draft systems, without any marked increase in downtime per furnace.

Lower Fuel Costs — Indications are that this type of operation will give a yearly tonnage per furnace within 5 per cent of that possible under the basic roof, which would be obtained by reduced downtime only. This increase in silica furnace production, he explained, will be obtained at a lower fuel cost due to a larger percentage of operating hours with the regenerative system in good operating condition, as compared to a longer campaign under a basic roof. In conclusion, the speaker pointed out that further work with a basic roof will depend on our prospects of obtaining a longer roof life, lower fuel costs and the demand for ingots.

A comparison of burned and unburned brick in basic ends as presented by various operators disclosed that burned brick did not need patching as did unburned brick. The trend shows the use of burned brick in the construction of port roofs and burner arches. One operator explained that he had installed burned brick in one end of the furnace and unburned brick in the other and that the behavior was alike in both instances.

Two important operating kinks were brought out in the discussion of mixer linings. One operator reports that the greater tonnage per day that is put through the mixer, the greater the tonnage per campaign and the greater the life per day of the mixer lining. The temperature of operation of the mixer plus the amount of blast furnace slag plus the level of the iron in the mixer are the most important phases in mixer operation, in the opinion of another operator.

Raises Ingot Mold Yield

Heat generating compound maintains fluidity, prevents cold-shut formation

INCREASE of ingot mold yield in the production of killed steels from 77-78 per cent to nearly 85 per cent has resulted from tests recently conducted by one steel producer using a carbon-free exothermic liquidizer compound. Size of ingots produced by this company range from 8 x 8 to 14 x 32 inches and weigh up to 9000 pounds. It is estimated that a savings of $4 results from each $1 spent on the liquidizer.

An exothermically reactive composition which generates heat through oxidation of a metal or metals, the compound controls the rate of heat release by means of modification of one or more oxides. Once burned, the compound, a product of Pittsburgh Metals Purifying Co., Pittsburgh, changes from a heat generating agent to an insulating blanket preventing additional heat loss. It is used where it is desired to maintain a high degree of fluidity of the feeding metal or retard solidification during the feeding or shrinkage.

Weight of stainless steel billets is reported to have been increased 340 pounds on 6000 pound billet through the use of the compound by a stainless steel producer. The length of the same billet was also increased by as much as 15 inches, report states.

Crop is Reduced—Besides a substantial reduction in amount of return scrap, one of the major benefits derived through the use of the liquidizer in production of stainless and killed steel ingots is the consistently standard minimum "crop" which is said to result. Previous practice necessitated measuring each ingot prior to cropping.

General practice in the pouring of hot-top ingots has been to pour nearly 15 per cent additional metal in the feeding head, with about 7 to 7½ per cent shrinking down into the ingot as the metal solidifies, thereby preventing piping within the ingot itself. One user of the compound has reported this percentage of cropping return reduced from 8 to 3 per cent.

The compound is seeing other uses: Application to the bottom of the ingot mold before pouring to prevent formation of cold-shuts on the side of the mold; experiments for the possibility of using the hot-top technique in the production of stainless and killed steel; use in the pouring of low carbon steel into small ladles.

Poured into Metal Stream—The latter experiment has been conducted at one of the large government steel foundries in France, the compound being poured into the stream of metal as it passes from the large ladle into the small pouring ladle. This has permitted pouring of all of the metal from the small ladle without leaving the usual skull deposit. The Fomento Corporacion De La Produccion integrated steel plant in Chile and the National Steel Co., of Brazil also are using the exothermic compound at the end of the pouring operation of 125-ton ladles to prevent skull formation.

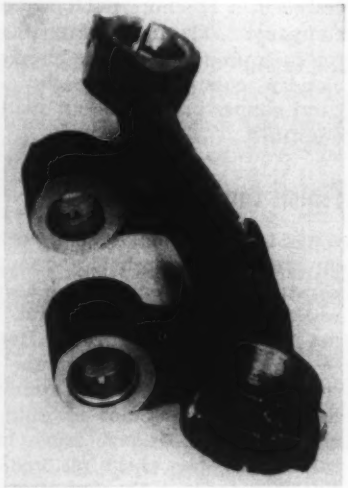
Exothermic material will ignite at or above temperatures of 300° F and will react within itself exothermically to produce a temperature in excess of 3000° F. Material may be compounded with a suitable binder and shaped as rings, the center of which constitutes a feed passage from a riser to a casting. It may also be formed in the shape of fillets or thin slabs for insertion in sand flasks or permanent molds.

Offers Bronze Bearing Catalog

A LARGE variety of bushings and bearings plus bar, bronze and babbitt are listed in catalog No. 500, available from Johnson Bronze Co., New Castle, Pa. Added to the catalog are several new electric motor bearings; standard stock sizes of plain bearings and the size range of the bars remains the same. Bearings for over 20 makes of electric motors are illustrated and listed.

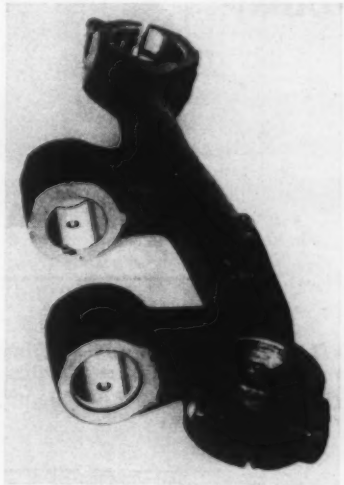
FIXTURES...

Provide Broaching Accuracy



CONTRIBUTING to the accuracy of broaching two steering knuckle supports simultaneously is fixturing which provides for accurate locating with respect to previously machined bolt bosses. The parts, one left and one right hand, are supported between the arms of the knuckle support to prevent distortion as the broach is pulled through the rough bored holes on a 10-ton, 54-inch stroke pull-down broaching machine made by Colonial Broach Co. of Detroit.

Prior to the start of the operation, parts are slipped over support pins which fit into the split end holes. In the automatic machining cycle, four square bar-type clamps advance and slide over the suport pins, holding the parts in place. As the clamps are spring loaded, jamming or breakage in case of oversize parts is said to be prevented. Inward pressure is applied on the parts by rotating the trunnion-type fixture.



Next operation in the automatic sequence sees support jacks automatically move into place to support the projecting knuckle support bosses during the cutting. The machine is equipped with follow rest guides to support broaches during the cutting.

ATLAS

INTRAPLANT HAULAGE

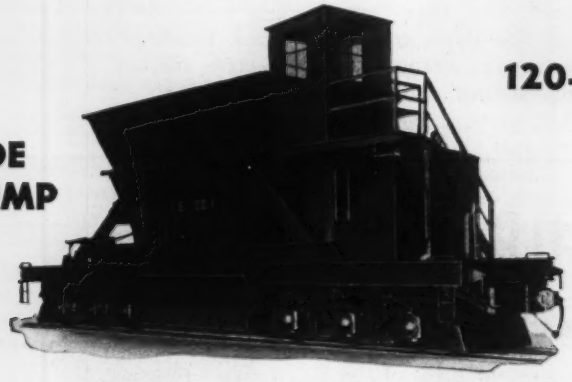
TO MEET SPECIFIC—INDIVIDUAL TRANSFER PROBLEMS

20-TON

DOUBLE HOPPER
BOTTOM DUMP SCALE CAR

120-TON

SIDE DUMP



ORE TRANSFER CAR

ATLAS BUILDS:—Scale Charging Cars and Ore Transfers; Indicating and Recording Dials for weighing scales; Electric and Storage Battery Locomotives; Coal Charging Cars; Door Extractors; Coke Quenching Cars; Turntables.

ATLAS ENGINEERING SERVICE
IS ALWAYS AT YOUR SERVICE

THE ATLAS CAR & MFG. CO.

Welded Stainless Tubing

In free machining type 303 available; has corrosion resistance and machinability

TESTS on threading, rough turning, reaming and finished machining show that a new free-machining welded stainless tube, made by Carpenter Steel Co., Alloy Tube Division, Union, N. J., is as machinable as type 303 bar stock. It is reported that the steel handles in automatic screw machines at about 70 per cent of the speed of SAE 1120 steel. In addition to easy machinability and corrosion resistance, the new steel in tube form is said to be nongalling, making disassembly of parts easy and helping to avoid scratching in moving parts.

Typical applications are all types of screw machine products, bearings and bushings, instrument parts, special valve parts, wax molds, etc. Only a moderate amount of cold working is recommended as the steel work hardens rapidly. It is not suited for cold working applications such as bending, flaring or rolling into tube sheets, the company asserts. Type 303 welded stainless tube is available in rounds or shapes from ¼ to 4½ inches OD and in all standard wall thicknesses.

Manufacturing Facilities Shown

ENGINEERING, equipment and materials used in contract production of welded steel fabrications at E. W. Bliss Co.'s Salem, O., plant are illustrated in a brochure published by the company. Manufacturing facilities for such products as gear blanks, machinery components, special structural shapes and flame cut metal are described.

Finish for Aluminum

APPLIED by a simple, nonelectrolytic dip with a solution held at room temperature is a chromate-type corrosion resistant finish for aluminum. Product of research by Allied Research Products Inc., Baltimore, the solution is said to give off no fumes during processing. Color ranging from clear to light bronze may be obtained from as short an immersion as 10 seconds. For greatest color intensity and optimum corrosion resistance, immersion time should be set at 2 minutes, the company reports.

Salt spray tests indicate resistance to corrosion for as long as 1000 hours on wrought stock and 250 hours for castings, depending upon alloy and treating time. Tests have indicated

high ratios ?

ONE OF 93

DE LAVAL
DOUBLE REDUCTION WORM GEARS

De Laval double reduction speed reducers, consisting of combinations of double worm gear reductions, or helical and worm gear reductions, are available with overall ratios up to approximately 8000 to 1. De Laval single reduction worm gear speed reducers are available in ratios up to 90 to 1. If high ratios are your requirement, worm gear speed reducers are the answer—particularly if space is limited and reliability is important. A De Laval representative will help you pick the right size and type.

This double reduction De Laval Worm Gear Speed Reducer is available in many standard ratio combinations, with horizontal or vertical output shafts and is but one of 93 sizes and types of standard De Laval Worm Gear Speed Reducers.

SEND FOR CATALOG WGB-14-Z

DE LAVAL

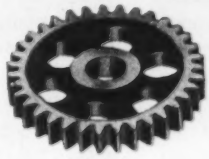
Worm Gear Division: De Laval Steam Turbine Co., Trenton 2, N.J.

TURBINES • HELICAL GEARS • WORM GEAR SPEED REDUCERS • CENTRIFUGAL PUMPS
CENTRIFUGAL BLOWERS AND COMPRESSORS • IMO OIL PUMPS

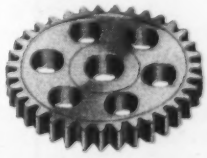
Powdermet cut production cost on this clutch finger by 500%!

Price

IS THE ONLY DIFFERENCE!



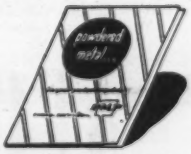
Powdermet saved 10 cents in the production of this spur gear!



POWDERMET* PARTS

Cost Less!

"Matched pairs" like these... actual production parts, one produced by conventional methods and one Powdermet, identical in precision and performance...prove the amazing economies made possible through Powdermet fabrication. And when special properties like electrical permeability or controlled porosity are important, Powdermet parts offer functional advantages too! Exclusive Powdermet production techniques have extended the application of powder metallurgy to whole new production fields—helical gears, stress members, filters—write today for the free booklet shown here and see how you can save with Powdermet parts!



SEND FOR THIS FREE BOOKLET

Check Powdermet advantages for your gears • filters • cams • pole pieces • ratchets • tuning cores • keys • latches • bearings • pawls • sprockets • valves • switch parts

PMP

POWDERED METAL PRODUCTS CORPORATION
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9335 West Belmont Avenue
Franklin Park, Illinois

*Trademark

that the coating provides excellent adherence for the paint to the metal.

Also said to possess a high resistance to abrasion, the coating allows parts to be buffed, mechanically and roughly handled or formed, without materially affecting the coating. Other tests have shown that the coating, called Iridite Alcote, aids materially in shielded arc welding, but that there may be limitations on its use on parts to be spot welded.

Packing Them In

SPECIFIC uses for some 76 different types of corrugated boxes, along with construction features of each, are presented in a 32-page booklet, "How To Pack It". Describing various standard and specialty boxes used for packaging and shipping virtually every kind of product, it is published by Hinde & Dauch Paper Co., Sandusky, O.

Specially engineered shipping boxes designed to fit difficult-to-pack items, shelf and counter boxes, display and luggage-type boxes, prepaks, duplex, and other types of boxes are covered in the book. Directions for the proper sealing of each type of box are included in the descriptive matter, as well as recommendations as to the type of production for which each box is best suited.

Electronic Time Study

Imitates actions of factory machines and their operators but hundreds of times faster

HOW would you like to perform a day's work in a matter of a few seconds? This can be done and with no evident signs of fatigue by a time study computer which simulates machine and operator actions through electronic tubes. Developed by Potter Instrument Co., Flushing, N. Y., it may be used to study frequently-changing combinations of automatic machine cycles. Electronic machines calculate the production of each machine of a group and the waiting time during which the operator is not loading any machine.

Computations involving loading and running time cycles of freqently changing set ups often require a large staff of statisticians. According to the company, this tedious work is eliminated by the electronic device which completes payroll or production studies much faster and with unbiased accuracy. Longer work periods may be studied in a few seconds. Computer is operated by one person who sets dials from work slips; no additional skill is required other than that needed to operate an adding machine.

"I have records of ten different machines to be computed", you might say. This computer reportedly can simulate the operation of as many as ten different machines simultaneously. Each individual loading and running time which has been determined by usual time study methods is set into the computer in decimal minutes. Once a button is pressed, the machine simulates operator and machines for any preset period at a speed of 1000 elements of time per second. Where times are carried to thousandths of a minute, the computer simulates an hour's work in less than 60 seconds. If times in decimal hundredths are inserted, ten times this speed may be achieved.

High Output Automatic Machine

AN AUTOMOBILE manufacturer will be able to drill, chamfer, rough and finish ream 575 piston pins per hour with the operation of a new automatic hopper fed multi-driller, built by National Automatic Tool Co. of Richmond, Ind. Machine has a central fixture with heads sliding on bed ways from opposite side. Hopper feed and loading, clamping, unclamping and ejecting operations are accomplished automatically.

Pushbutton operated, the machine

STEEL TODAY...
STEEL for the FUTURE...

AVONDALE

More and more in the marine industry, especially at AVONDALE MARINE WAYS . . . *steel* is used! In building and repairing ships of all types, in the fabrication of equipment for offshore oil drilling, in all the work AVONDALE does—*steel* is the material most used!

AVONDALE MARINE WAYS, INC.

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QUICK REPAIR PLANT . . . HARVEY, LA.
MAIN PLANT: AVONDALE, LA.

features a chip conveyor attached to the rear of the fixture and running in under the fixture to carry chips out of the machine. Four parts are processed at one time.

30,000 Lines per Inch

New machine expected to allow scientists to probe remaining mysteries of steel making

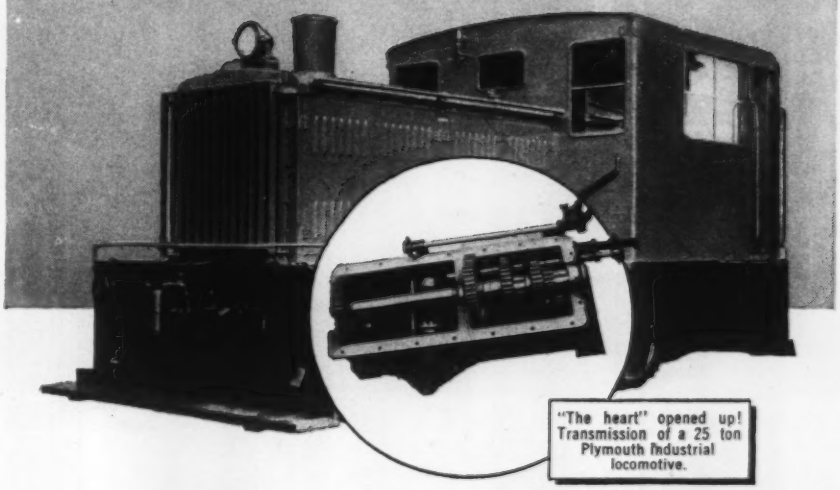
IF YOU were given a penny for each separate and distinct line you could draw across a 1-inch expanse, you might end up with enough of the copper coin to exchange for 50-cent piece. A far cry from the simple manual technique is a new machine for cutting diffraction gratings, important to science and industry, which will allow scientists to probe further into the mysteries of the universe. These machines are said to be the most precise known to engineering science. Gratings consist of from 5000 to 30,000 equidistant lines per inch etched on glass which has been coated with aluminum.

Precision can be understood when it is realized that this machine will cut 25 absolutely straight lines, equidistant to 0.001 of 0.001-inch on the straight edge of a cigarette paper. Development of several of the component parts was done under the cooperation of Office of Naval Research, through the Hopkins Institute for Cooperative Research, Johns Hopkins University, Baltimore, Md. New cutting machine is professed to be capable of producing gratings up to 6 inches in length in 3 days. With the added speed gained by the new machine over previous types, it will be possible to come nearer to satisfying the urgent demand of scientific laboratories and industrial plants waiting to secure a 6-inch grating.

Diffraction gratings are used in the steel industry. Before their discovery it was necessary to remove from the blast furnace bits of the mixture of molten iron ore, limestone and alloying metal, in order to make a chemical analysis and determine whether the steel had reached the proper state. This was time-consuming and often resulted in imperfections before tests could be completed. Now a small bit of molten metal is removed and put in an arc; the intense light it emits is beamed on a diffraction grating and quickly studied through a spectroscope. The spectral color for every chemical property is known. When the molten mixture casts a certain spectral line combination, the foreman knows the ingredients of the steel have reached correct state.

UNITCASTINGS ...

"THE HEART" OF INDUSTRIAL LOCOMOTIVES



"The heart" opened up! Transmission of a 25 ton Plymouth industrial locomotive.

"The heart"—or transmission of Plymouth industrial locomotives built by Fate-Root-Heath Company, Plymouth, Ohio, have functioned nearly *20 years without a failure.* These hundreds of Plymouth "hearts" depend on Unitcastings for long, economical service!

Unitcast spur gears give higher quality at lower end cost.

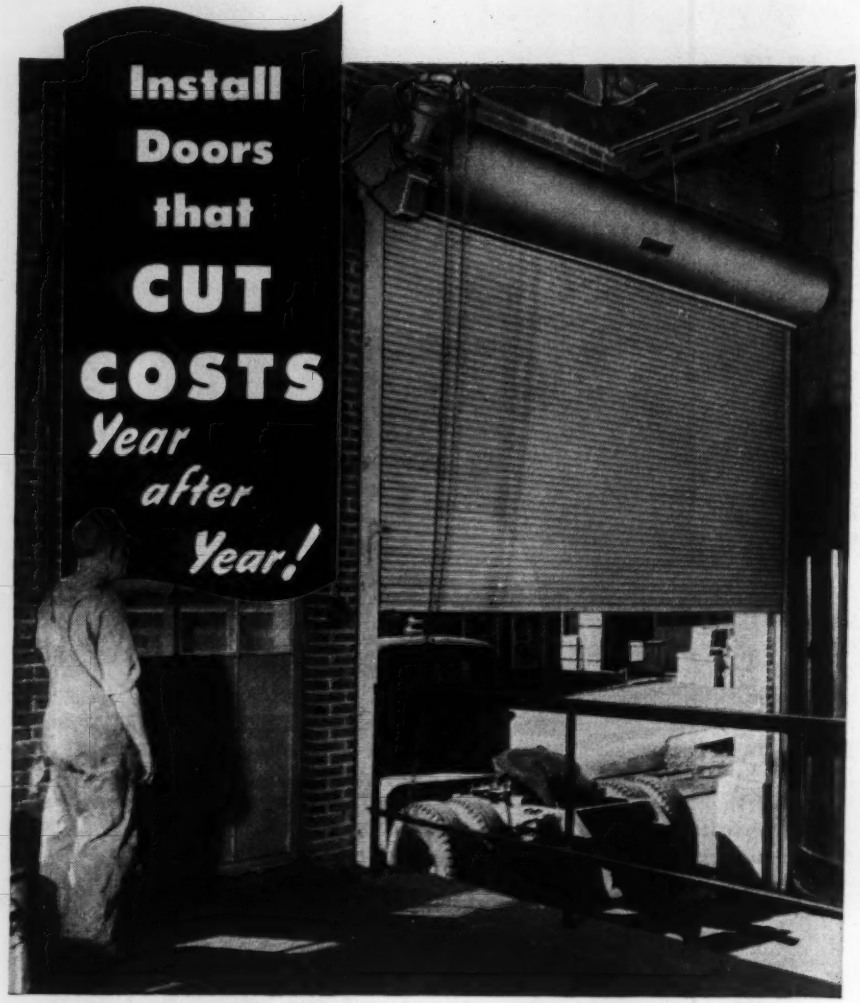
Unitcastings have a heart too—quality! Working with special alloys, close tolerances, difficult casts, Unitcastings give you a lower end cost and add "old age" to the heart of your product without missing a beat. Take a lesson from a locomotive. Build a better product with Unitcastings.

UNITCAST

QUALITY STEEL CASTINGS

Unitcast will welcome the opportunity to provide a "cast steel" answer for your parts problems, too. Our suggestions toward design, *while your product is still on paper,* may save you many dollars in time and future revisions! Write or call today! Unitcast Corporation, Steel Casting Division, Toledo 9, Ohio. *In Canada:* Canadian-Unitcast Steel, Ltd., Sherbrooke, Quebec.

UNITCASTINGS ARE FOUNDRY ENGINEERED



KINNEAR Metal Rolling Doors

Reducing *door costs* is not the only gain you make when you install Kinnear Rolling Doors. You also help cut other plant costs, in many ways.

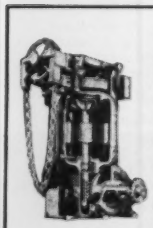
Coiling upward action permits full use of all floor and wall space around openings, at all times. You can stack materials within an inch or two of the door, inside or outside—*or on both sides*—without impeding its action. This promotes more efficient handling of door traffic, deliveries, and shipments.

The smooth, easy action of Kinnear Rolling Doors saves time and labor—and no other type of door is so well adapted to the extra advantages of motor operation. With pushbutton controls at any desired number of convenient points, the door can be raised or lowered quickly at a second's notice.

As a result, they are consistently closed more quickly after being opened, which brings important reductions in heating and air-conditioning costs.

When opened, the doors remain completely out of the way, safe from damage by wind or vehicles. When closed, their rugged all-metal interlocking-slat curtain assures extra protection against fire, intrusion, wind and weather.

Kinnear Rolling Doors are built in any size, to meet the particular specifications of each opening, in old or new buildings. Motor or manual control. Write for full information.



With this rugged Kinnear Motor Operator, doors can be opened or closed from any number of convenient push-button controls.

Saving Ways in Doorways

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Offices and Agents in All Principal Cities

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Factories: 1780-1800 Fields Ave., Columbus 16, O.
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CALENDAR OF MEETINGS

Apr. 24, Packaging Machinery Manufacturers Institute: Semiannual meeting, Hotel Sheraton, Chicago. Institute headquarters are at 342 Madison Ave., New York.

Apr. 24-26, American Mining Congress: Coal convention, Netherland Plaza Hotel, Cincinnati. Association headquarters in Ring Bldg., Washington 6, D. C.

Apr. 24-27, American Management Association: National packaging exposition, Navy Pier, Chicago. Association headquarters are at 330 W. 42nd St., New York.

Apr. 24-27, American Society of Mechanical Engineers: Process industries division and Pittsburgh mechanical engineering conference, Hotel William Penn, Pittsburgh. Sponsored by Process Industries Division and Pittsburgh chapter ASME. Society headquarters: 29 W. 39th St., New York. Cooperating societies: Engineers Society of Western Pennsylvania, Society for Advancement of Management, American Materials Handling Society.

Apr. 24-27, National Highway Users Conference: Annual meeting, in Washington.

Apr. 25-26, Metal Powder Association: Annual metal powder show, Book-Cadillac Hotel, Detroit. Association headquarters are at 420 Lexington Ave., New York.

Apr. 25-26, Machine Tool Electrification Forum: Sponsored by Westinghouse Electric Corp., at Hotel Statler, Buffalo.

Apr. 25-29, American Society of Civil Engineers: Spring meeting, Ambassador Hotel, Los Angeles. Society headquarters are at 33 W. 39th St., New York 18.

Apr. 26-28, American Petroleum Institute: Eastern district, division of production meeting, at Hotel Cleveland, Cleveland. Institute headquarters are at 50 W. 50th St., New York.

Apr. 27-28, American Steel Warehouse Association: Annual meeting, The Shamrock, Houston. Association headquarters are in the Terminal Tower, Cleveland.

Apr. 28, Malleable Founders' Society: Western sectional meeting, Drake Hotel, Chicago. Society headquarters are in the Union Commerce Bldg., Cleveland.

May 3-4, Purdue University Welding Conference: Twenty-first annual conference and welders' institute and exhibit, Lafayette, Ind. Two concurrent programs: Technical papers for engineers, designers, research and production personnel; gas and electric welding instruction for welders and supervisors. Further information from Technical Extension Division, Purdue University, Lafayette, Ind.

May 3-5, National Air Pollution Conference: First government-sponsored conference of its kind, to be held in Washington, D. C. Various government agencies participating. Panels to cover meteorology, health, properties, instrumentation and analytical methods, agriculture, economics, legislation.

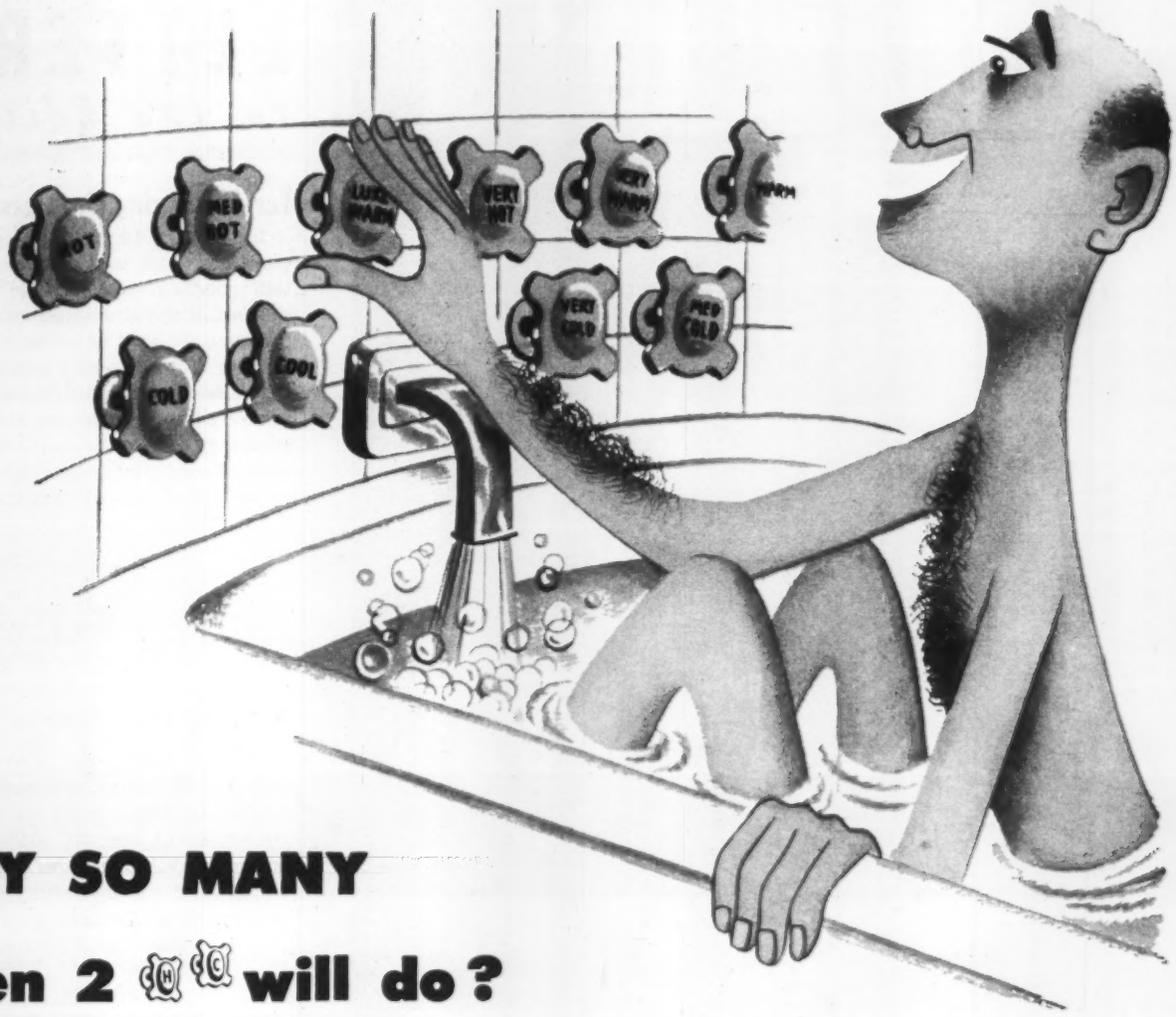
May 7-9, Conveyor Equipment Manufacturers Association: Meeting, The Homestead, Hot Springs, Va. Association headquarters at 1129 Vermont Ave. N. W., Washington 5, D. C.

May 8-11, Liquefied Petroleum Gas Association: Convention and trade show, Palmer House, Chicago, Ill. Association is located at 11 S. LaSalle St., Chicago 3, Ill.

May 8-12, American Foundrymen's Society: Foundry congress and show, Cleveland Public Auditorium, Cleveland, O. 616 S. Michigan Ave., Chicago 5, Ill., is headquarters of society.

May 8-12, National Association of Textile Machinery Manufacturers: Exhibition, Atlantic City Auditorium, Atlantic City, N. J. Address association c/o Universal Winding Co., Providence 1, R. I.

May 11-12, National Association of Sheet Metal Distributors: Meeting, William Penn Hotel, Pittsburgh. Headquarters of association are at 505 Arch St., Philadelphia 5.



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when 2 (H) (C) will do?

Complicated, isn't it?

Same way with the problem of selecting alloy steels. More and more of our customers are telling us they like the idea of only 2 alloy steels to handle most of their jobs such as gears, cams, shafts, etc.

Think of the savings you can now make in reducing your alloy inventory, in simplifying heat treatment and in straight-run machining with:

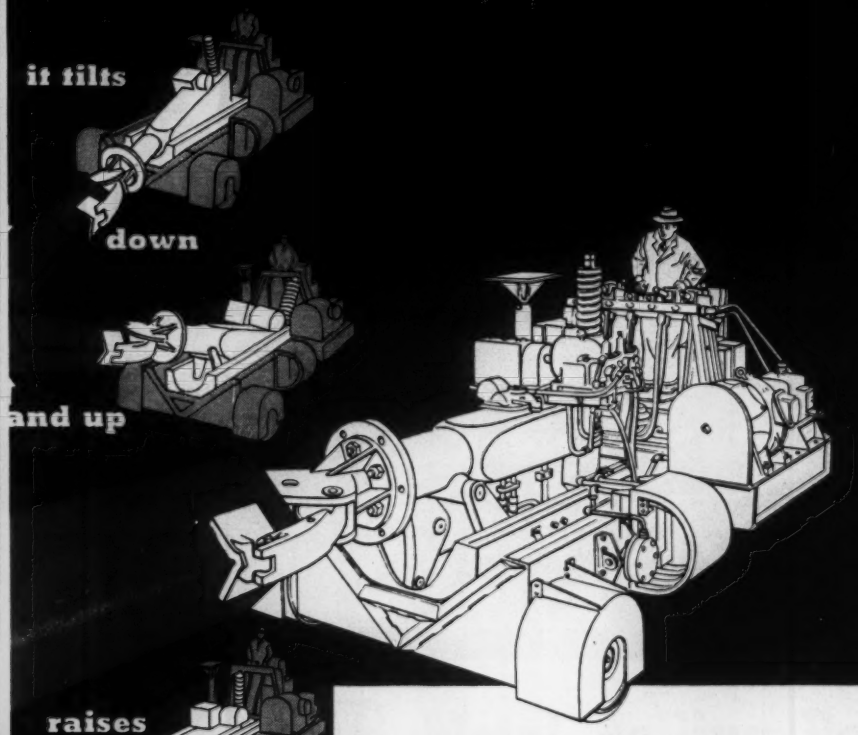
JUST 2 Carpenter alloy steels instead of all these A.I.S.I. grades { 2340 3145 4130 4340 4640 6145 8645 8750 2317 2517 3115 4320 4615 6120 8615 4812

The Carpenter booklet called "2 Steels" shows how it is possible for 2 aircraft quality alloy steels to take the place of many on most of your production and maintenance jobs. For your copy of the booklet and complete data on physical properties, just drop us a note.

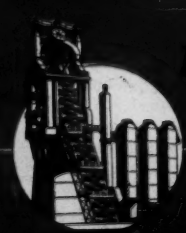
THE CARPENTER STEEL COMPANY
139 W. Bern Street, Reading, Pennsylvania

Only Carpenter Gives You This Way to Replace Many A. I. S. I. Grades with Just 2 Alloy Steels

agile*



*Amazingly enough, you'll find *agile* an apt description of the massive Brosius Auto Floor Manipulator at work on your forging floor. With swift agility it draws or charges — turns on a dime and moves with independent facility — manipulates the billet or blank with remarkably sensitive movements. And each unit possesses the inherent sturdiness and sensible simplicity so typical of Brosius products. Brosius manipulators will bring to your forge shop added speed, added safety, added economy — you should be using them. Write for literature.



LETTERS *to the Editors*

For Measuring Droplets

In the Dec. 12, 1949, issue of STEEL, page 83, there appeared a paragraph telling of a new electronic device developed at the University of Wisconsin for measuring the sizes of droplets formed from a spray nozzle. At the institute we are studying the performance of sprays and are interested in learning more about the above device. Would you please let me know to whom I might write to obtain more information?

C. L. Tsaros
Institute of Gas Technology
Chicago, Ill.

For further information on the electronic device, write to Prof. R. J. Parent, electrical engineering department, College of Engineering, University of Wisconsin, Madison, Wis.—The Editors

Winging Their Way to Spain

Having read your interesting article about "New Methods for Determining Phosphorus in Steels" in your issue of Jan. 30, 1950, we would be much obliged to you if you kindly would send us, by return of airmail, two reprints of same.

Pedro Oller, Managing Director
Fabricacion de Envases Metalicos S. A.
Madrid, Spain

Tearsheets of the article, detailing research conducted jointly by Ford Motor Co., Detroit, and the University of Michigan, are being sent.—The Editors

Interesting Reading

We have just received your article on production of seamless steel pipe and tubes, this being No. 14 of a series of 27 articles being published. This article proved to be very interesting reading; we would like to have additional information on the previous 13 publications. Also, the writer would like to be placed on your mailing list for the balance of the series.

H. F. Walz
Purchasing Department
Whitlock Mfg. Co.
Hartford, Conn.

Reprints of all chapters in the "Fundamentals of Steelmaking" series are available from STEEL's Readers' Service Department, prices ranging from 20 to 75 cents per reprint. Address: 1213 W. Third St., Cleveland 13, O. —The Editors.

Robinson-Patman Act & Scrap

Much thought is being given in scrap circles in invoking the Robinson-Patman Act. It would seem from recent rulings of the United States Supreme Court and from the ruling of the circuit court of appeals that a scrap dealer can't operate a yard in competition with other dealers and at the same time be a broker. For

being a broker gives him an unfair advantage over the other dealers because it enables him to pay more for scrap to collectors and factories.

Time and again dealers who are also brokers have lured away business from other dealers by passing on what should have been their brokerage fee to the collector or the factory that had the scrap.

The United States Supreme Court and the United States Circuit Court of Appeals have recently ruled that anything which tends to give a competitor an advantage in a price way is in violation of the Robinson-Patman Act. It seems to us that under the act we can compel dealers who are also brokers to choose between being a dealer or a broker; they can't be both.

Alfred Slotnikoff
Rochester, N. Y.

Savings on Gloves

On page 95 of your Nov. 7, 1949, issue of STEEL, under Mirrors of Motordom, there is an article in regard to saving on work gloves. Kindly advise the name of the company manufacturing this plastic glove at $.88 a pair and also give us the name of the plant where a saving of $71,703 was effected on the switch from rubber to plastic gloves.

F. H. Dolan, Buyer
Fedders-Quigan Corp.
Buffalo, N. Y.

We are unable to give you the name of the plastic glove manufacturer, but we can assure you the figure mentioned is correct. It is not possible to reveal the name of the company making the savings.—The Editors

Conveyors of Aluminum

We are interested in learning a source for roller conveyors made from aluminum. This conveyor should be in 10-foot sections. We realize that while the buyers' guides which we have in our department do list various manufacturers of roller conveyors, they are not specific with reference to an aluminum conveyor. Since we know that you have considerable contact with this type of industry, we would appreciate it if you would advise us whom you would consider sources for this type of item.

E. E. Bausman
Assistant Purchasing Officer
Newark Stove Co.
Newark, O.

We know of manufacturers of conveyors falling into the aluminum, roller and 10-foot length categories, but are not certain of any whose product incorporates all three requirements. The following are among the conveyor manufacturers: Sage Equipment Co., Buffalo 13, N. Y.; Arrow Products Inc., Grand Rapids, Mich.; Lyon Metal Products Inc., Aurora, Ill.; Island Equipment Corp., New York 17, N. Y.; Standard Conveyor Co., North St. Paul 9, Minn.; Market Forge Co., Everett 49, Mass.; Mercury Conveyors Inc., Hillsdale, N. J.; Rapids-Standard Co. Inc., Grand Rapids 2, Mich.; Lamson Corp., Syracuse 1, N. Y.; Logan Co. Inc., Louisville 6, Ky.; Mathews Conveyor Co., Elwood City, Pa.; Robins Conveyors Div., Hewitt-Robins Inc., Passaic, N. J.—The Editors

Only one rolled steel floor plate gives you complete *anti-skid* protection

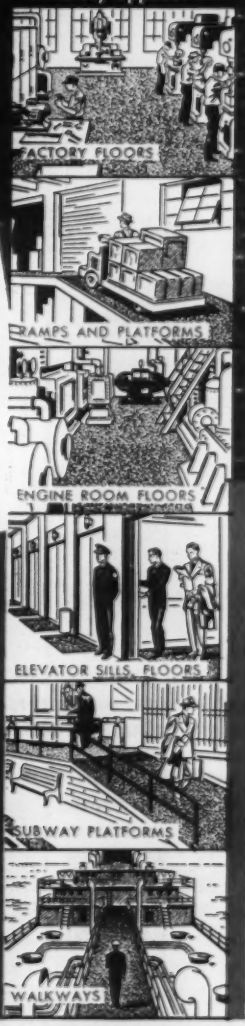
NON-SLIP EVEN ON STEEP INCLINES

It's New, Revolutionary

ALGRIP

ABRASIVE ROLLED STEEL FLOOR PLATE

A.W. ALGRIP has hundreds of safety applications



There's nothing like it, absolutely nothing like A.W. ALGRIP. It's the one and only Abrasive Rolled Steel Floor Plate. A.W. ALGRIP is made by rolling tough abrasive grain (the same type used in grinding wheels) as an integral part of the upper portion of steel floor plate. Results: A floor plate that's truly non-slip even when wet or on steep inclines. It keeps men's feet safe and secure.

Because Algrip is rolled steel, it is stronger than other abrasive floorings and withstands severe punishment without cracking or chipping. Then, too, thinner sections may be used without reducing load carrying capacity.

Get complete information about A.W. ALGRIP now. Write or use the coupon for a FREE copy of our 8-Page Catalog.

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A.W. ALGRIP ABRASIVE ROLLED STEEL FLOOR PLATE
A Product of ALAN WOOD STEEL COMPANY
CONSHOHOCKEN 18, PA.

Gentlemen: *Please rush me complete information and a FREE copy of your 8-PAGE A. W. ALGRIP Booklet.*

Name _____ *Title* _____
Company _____
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Other Products: PERMACLAD Stainless Clad Steel • A.W. SUPER-DIAMOND Floor Plate • Billets Plates • Sheets • Strip • (Alloy and Special Grades)

"Good Service on special sizes"... that's only one of the things we mean by Service Plus!

BARS · PLATES · FLOOR PLATE
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STAINLESS
ALLOY STEELS
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TOOLS · EQUIPMENT
MACHINERY

● In a recent survey, one customer gave "Good service on special sizes" as his reason for ordering his steel from United States Steel Supply Company. And his words summed up the statements of many of our customers. Whenever your problems involve steel in special sizes, forms or specifications, call United States Steel Supply Company. We'll do our best to live up to our customers' high opinion of our service.

Service Plus includes many things besides "Good service on special sizes," however. It features prompt delivery, large capacity and an unrivaled reputation for service. *Service Plus* specializes in courteous attention to your every requirement —it's our way of saying *we'll do all that is humanly possible to supply you with the steel you want . . . where you want it . . . when you want it.*

WHEN YOU DEAL WITH US, YOU GET Service Plus!

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Warehouses and Sales Offices: BALTIMORE · BOSTON · CHICAGO
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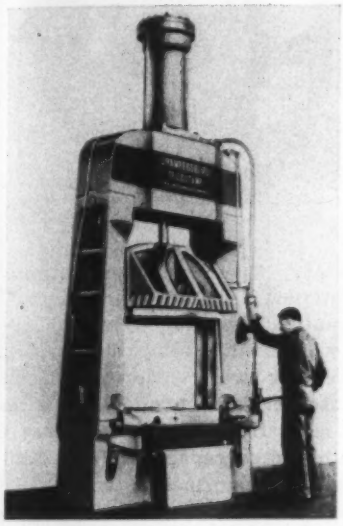
UNITED STATES STEEL

New Products and Equipment

More Efficient Drop Stamp

Ten per cent more powerful than preceding models is the model L Cecostamp, announced by Chambersburg Engineering Co., Chambersburg, Pa. Using impact blows of controlled intensities to produce a wide variety of metal shapes from any of the formable metals, the drop stamp has control mechanisms



located in such a position that the operator is free of moving parts. With the overhead safety rest control, operator stands on both feet; at the same time both hands are occupied and cannot be under the die. Self-positioning safety rests, built into side frames between the guides, hold the ram when changing dies or working between dies.

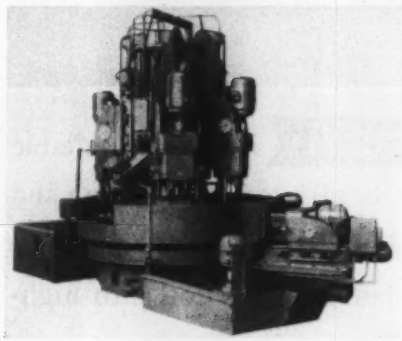
A steel bolster plate on the anvil equipped with T-slots aids in rapid and accurate die setting. Stamp is provided with shock insulating features to cushion vital parts. Lubrication of valve cylinder and guides is automatic.

Check No. 1 on Reply Card for more Details

Safety Features Included

Safety features that improve efficiency and eliminate elements contributing to down time are incorporated in the Roto-Matic station type vertical indexing machine developed by Davis & Thompson Co., Milwaukee 14, Wis. Six stations are provided with two-station holding fixtures to take both right and left hand parts, so that the workpieces are removed in pairs. There are five working stations and one loading station. Index is by a hydraulic mechanism designed to eliminate the shock during acceleration and deceleration of the table.

Power heads, in both vertical and horizontal mounting positions, have a mechanical electrical feeding mechanism which embodies a feed

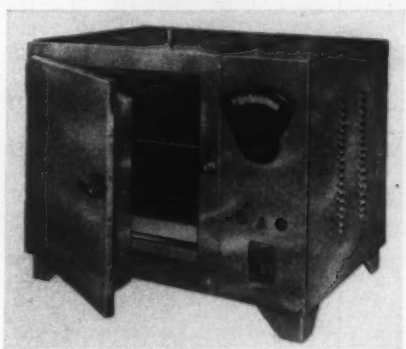


screw. Change gears are provided for varying feed and spindle speeds, and lubrication is automatic. A screw feed clutch throws out automatically in the event of overloading. Among the safety features is a panel of pilot lights which enables the operator to continually check the operations of the machine without leaving his position.

Check No. 2 on Reply Card for more Details

Lab or Production Ovens

Precisely controlled clean dry heat for baking, drying or preheating operations may be furnished by Blue M high temperature electric gravity convection ovens, built by Modern Electric Laboratory, 306 W. 69th St., Chicago 21, Ill. Double walled



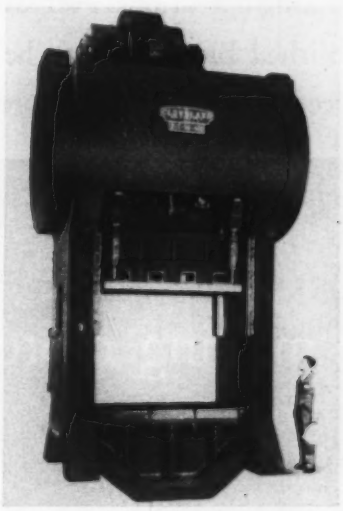
housing and door are of polished stainless steel. All six sides have 5 inches of dual insulation—Therm-O-Block plus fiberglass. Intake ports at bottom of oven allow fresh air to enter and be diffused through a perforated diffuser plate.

An electric indicating and controlling hydraulic unit automatically maintains temperature inside the oven. Three series are available with ranges to 800, 1000 and 1200° F. Heating element spread over entire width and depth of bottom compartment insures temperature uniformity. Pressure type door has an explosion-proof latch.

Check No. 3 on Reply Card for more Details

Counterbalanced Toggle Press

Both the slide and blankholder are air counterbalanced in the model 2T-96-400 straight - sided double crank, double-action toggle press,



built by Cleveland Punch & Shear Works Co., Cleveland 14, O. Employing a double gear, twin drive, and equipped with single station electrically controlled air operated drum type friction clutch, the press has a flywheel arranged with an auxiliary air brake.

Inner slide has a stroke of 33 inches and the blankholder slide a stroke of 22 inches. An 8-inch adjustment is provided for both slides. Press bed area is 60 x 96 inches and capacity rating is 400 tons for the inner slide and 250 tons for the outer or blankholder slide.

Check No. 4 on Reply Card for more Details

Brake For Presses and Shears

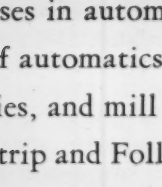
Operated by air at shop line pressures through an electric solenoid valve and pushbutton is the friction clutch-brake for punch presses, power shears and start-stop operations in general, offered by Industrial Clutch Corp., Waukesha, Wis. Unit features a drive disk with flexible fingers solidly bolted to the flywheel to eliminate looseness and wear at

. . . even tempered for dies

FOLLANSBEE STRIP STEEL in coils is available in a range of tempers and finishes for all types of stamping and forming operations. Follansbee Cold Rolled Strip and Follansbee Polished Blue Strip can be fed right from the coil into high-speed machines for real productioneering in

making motorcars for millions

FOLLANSBEE STRIP STEEL has many potential uses in automobile parts fabrication where continuous feeding of automatics is so vital to cost-control. The machining qualities, and mill finish characteristics, of Follansbee Polished Blue Strip and Follansbee Cold Rolled Strip fit right into the pattern of precision manufacturing. Just call the Follansbee Steel Representative nearest you for full information.



FOLLANSBEE STEEL CORPORATION

this point and detachable in segments to reline worn facings. Axial pressure for actuating the clutch is supplied by compressed air acting on a floating piston in an aluminum cylinder.

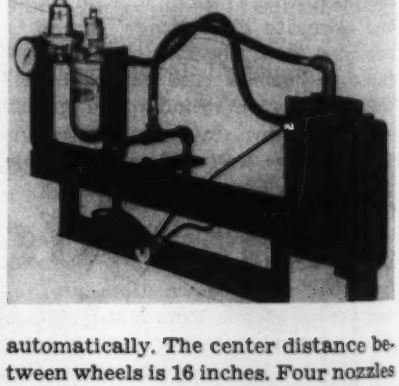
Brake pressure is obtained by preloaded springs which also serve to release the clutch and return the

piston. Operating temperatures in continuous operation up to 10 per minute are said not to exceed 140° C. Low operating temperature permits a larger work load on machines. Clutch brake is available in a range of sizes from 8¼ to 35 inches OD, with torque capacities from 3660 to 578,000 pound/inches.

Check No. 5 on Reply Card for more Details

Conveyor Lubricator

Automatic lubrication of bearings in 1¼-inch diameter wheels running on a T-beam is performed by a lubricator unit designed by J. N. Fauver Co. Inc., 49 W. Hancock, Detroit 1, Mich. Wheels have roller bearings which must be oiled frequently and



automatically. The center distance between wheels is 16 inches. Four nozzles direct oiled air jets to both inside and outside of each wheel bearing. Conveyor speed is 10 fpm.

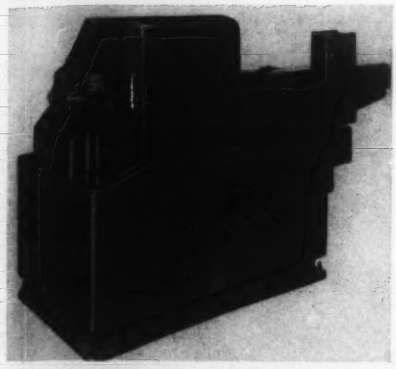
As each pair of trolley wheels passes the lubricator, they trip triggers which automatically release jets of oil fogged air directly into the bearings. A regulator with back

mounted gage is used for establishing a proper operating pressure of about 40 psi. Air pressure, volume of lubricant, direction and timing are easily adjusted.

Check No. 6 on Reply Card for more Details

Automatic Forming Machine

External grooves and shapes may be formed, as well as various end operations, on tubular or solid stock by an automatic machine announced by Motch & Merryweather Machinery Co., 715 Penton Bldg., Cleveland 13, O. Single or double, hollow, collet



type spindles are available and banks of double spindle machines may be formed as production requirements dictate. Heavy duty tool slides carry the form and end operation tools, advancing and retracting automatically by cam operation.

When arranged as an automatic bar feed machine, a magazine stock loader can be provided. Hopper loading from the front or rear may be furnished. Entire cycle is actuated mechancially by a single cam shaft. Spindles are driven by individual V-belt motor drives.

Check No. 7 on Reply Card for more Details

Pressure Block Gage

To measure rolling pressures on continuous strip mills, Pratt & Whitney Division, Niles-Bement-Pond Co., West Hartford 1, Conn., is announcing an Electrolimit pressure block gage. Pressure blocks are mounted on the mill housing between the top bearing and the screw or between the bottom bearing and the housing. Two gages are required for each mill stand. One gage is on the drive side and the other on the operating side. Gages are pretested on a testing machine and may be installed without further calibration.

Precalibration permits movement from one mill to another. Pressure measurement is obtained by accurately measuring the compression of

THE ONLY WAY YOU CAN BEAT FORGINGS AS A SALES FEATURE IS TO USE MORE FORGINGS

A REFERENCE BOOK ON FORGINGS FOR ALL USERS OF METAL PARTS

60 pages of authoritative information on metal quality as developed in forgings formed through the use of closed impression dies. Forging production techniques are described and illustrated; economic advantages of forgings are presented from the viewpoint of top management, design engineers, metallurgists and production executives. Your copy is ready. Fill in and attach coupon below to your business letterhead.

● What a forging *has*—can't be duplicated! No other method of fabricating parts utilizes fully the fiber-like flow line structure of wrought metals. Thus, forgings provide matchless capacity for the toughest work loads and fortify your product for better performance. Forgings forestall and reduce downtime due to failure of highly stressed parts; provide a factor of greater safety for men and machines. A recheck of every stressed part, as well as simple handles and levers, frequently reveals opportunities to improve a product, to reduce the cost of machining and finishing or to speed up assembly. Consult a forging engineer—only a forging engineer can inform you fully regarding the many quality advantages and cost-reducing possibilities that are obtainable with forgings.

DROP FORGING ASSOCIATION

Please send 60-page booklet entitled "Metal Quality—How Hot Working Improves Properties of Metals", 1949 Edition.

NAME_____

POSITION_____

COMPANY_____

ADDRESS_____

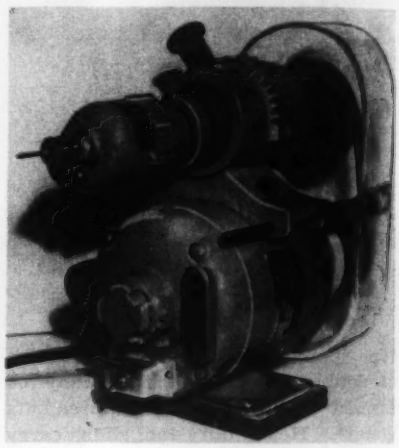
Just another horse?
Before a race the crowd identified him by number. Horses look pretty much alike. But everybody knew him at the finish line, because only once in his life did he fail to cross it first. *This* horse was Man o' War.
Presses look pretty much alike, too—in pictures. But in the shop, under production conditions, you can spot a Clearing press by the work it turns out and the steady way it keeps at it with minimum interruption for attention to either dies or press. That's why you'll find so many Clearings in plants where real costs are recognized and controlled.
It will pay you to discuss your metal-working problems with one of our sales engineers. Call or write without obligation.
CLEARING
PRESSES
THE WAY TO EFFICIENT MASS PRODUCTION
CLEARING
CLEARING MACHINE CORPORATION
6499 WEST 65TH STREET • CHICAGO 38, ILLINOIS

a ring and this measurement is converted into pounds pressure through the medium of the testing machine. A temperature compensator incorporated in this gage maintains accurate readings over a wide temperature range. Gages are available in capacities ranging from 5000 to 3,000,000 pounds.

Check No. 8 on Reply Card for more Details

Tapping Attachment

Charles L. Jarvis Co., Middletown, Conn., is offering a bench type torque-driven tapping attachment for bench tapping and drilling operations. Called the Torqomatic, the unit consists of a built-in tapper, powered by



the desired electric motor. It is available in three models: Model 101 from 0 to 3/16-inch, model 202 from 3/16 to 5/16-inch and 303 from 5/16 to ⅝-inch. Pulley drive is plastic guard-enclosed.

Check No. 9 on Reply Card for more Details

• • •

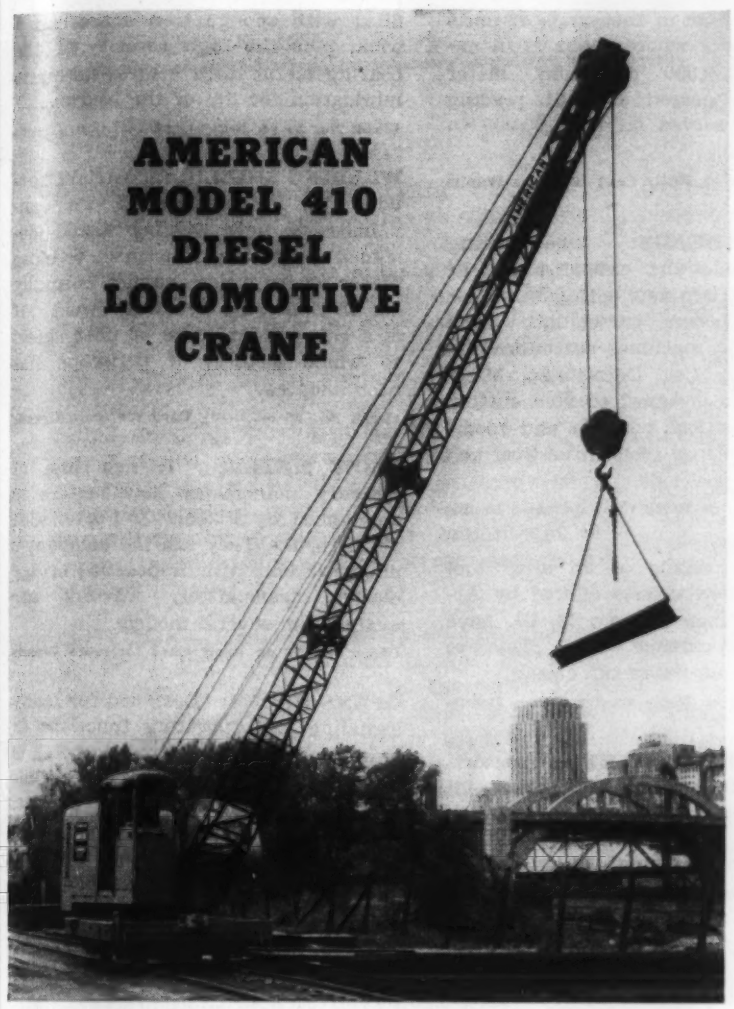
THERMOSETTING RESIN: Designated as Duron, a new type of thermosetting resin used as an acid and alkali-proof cement or coating is introduced by Electro Chemical Supply & Engineering Co., Emmaus, Pa. It will adhere without use of a primer to concrete or metal and is self-hardening at room temperature.

Check No. 10 on Reply Card for more Details

HOLDER FOR WHEELS: Solid wheel holders for cylinder grinding wheels, announced by Blanchard Machine Co., Cambridge 39, Mass., eliminate sulphuring wheels into rings. Holder is available for No. 11 and No. 18 of the company's surface grinders.

Check No. 11 on Reply Card for more Details

LIGHTWEIGHT CONVEYOR: Averaging less than 350 pounds in weight, the new two wheel power booster and



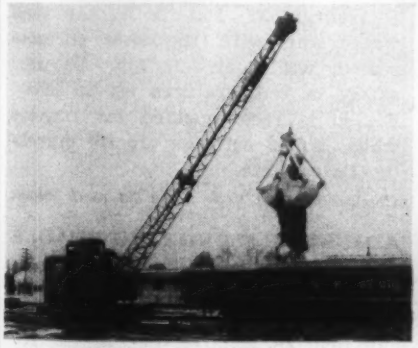
Works one hour on one gallon of fuel!

"Busiest piece of equipment we own..."

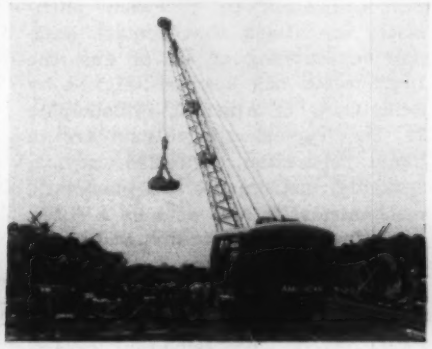
"Busiest piece of equipment we own" . . . "Never knew we had so many jobs for it to do" . . . "Gets around like a jack-rabbit" . . . "Ours is booked up for weeks ahead" . . .

That's the kind of talk you hear about the brilliant new American Model 410. Rated at 10 tons capacity, it's amazingly versatile and capable. Works on light track or bumpy track —anywhere. Shows its speed, its smoothness, its flexibility equally well with bucket, hook or magnet.

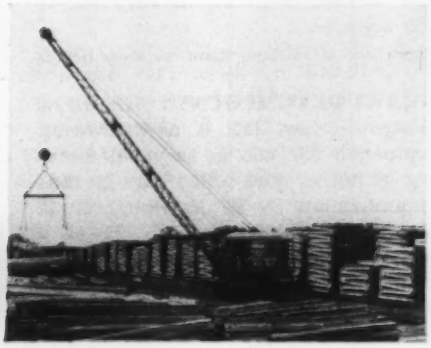
Want a crane that will almost never stand idle? One that works for a dollar-a-day fuel ration? One that cuts maintenance costs to the vanishing point? Mail the coupon below for literature!



BUCKET WORK shows off the Model 410's superb operating smoothness . . . fast swinging . . . quick action boom hoist. It moves coal, cinders, gravel, other materials . . . *fast.*



MAGNET WORK is making the 410 famous as one of the greatest scrap-handlers of all time. American push-button control provides over-excitation of magnet.



HOOK WORK highlights the perfect precision of American air controlled clutches. In addition, the 410 is adaptable to almost any type of special tackle.

American Hoist
& DERRICK COMPANY
St. Paul 1, Minnesota

Plant No. 2: SO. KEARNY, N.J.

Sales Offices: NEW YORK • PITTSBURGH • CHICAGO

19

American Hoist & Derrick Company
St. Paul 1, Minnesota 5610

● Please send literature on the American Model 410 Diesel Locomotive Crane.

Name_____

Company_____

Address_____

City_____ Zone____ State_____

stacker, available from Rapids-Standard Co. Inc., Grand Rapids 2, Mich., can be easily rolled into position. Known as Stevedore Jr., it is furnished in 10 and 16-inch belt widths and five standard lengths from 11 to 21 feet.

Check No. 12 on Reply Card for more Details

METAL COATINGS: Fidelity Chemical Products Corp., Newark 5, N. J., has developed strippable coating SP 14 for enameled, lacquered and plastic surfaces and Dip-Pak No. 532, a hot melt coating for metal parts, such as tools, gears and machined components. Both coatings may serve as temporary protection during processing, storage and shipping.

Check No. 13 on Reply Card for more Details

LIFTS METAL OBJECTS: Made by Merrill Brothers, New York, N. Y., the Adjusta-Clamp will lift any metal object up to 12 inches thick that its adjustable jaws can grip. Larger openings are available on special order. It has a movable gripping jaw that can be set by hand to accommodate the part to be lifted. It can lift from the horizontal to a vertical position without changing the grip.

Check No. 14 on Reply Card for more Details

QUENCHING OIL: Thermo-quench oil, made by Park Chemical Co., Detroit, Mich., is recommended for quenching steel in the 300 to 500° F temperature range. Flash point is 560° F and viscosity at 210° F is 150 seconds.

Check No. 15 on Reply Card for more Details

DRAWING COMPOUND: Known as Houghto-Draw 357, a new drawing compound for use in the cold drawing of hot or cold rolled bars or rods is announced by E. F. Houghton & Co., Philadelphia 33, Pa. It is a heavy paste containing high melting point waxes and fats combined with a colloidal pigment and has high adhesive properties.

Check No. 16 on Reply Card for more Details

TILTING BASE: Designed for fractional horsepower motors, the new tilting motor base introduced by Gerbing Mfg. Corp., Chicago 6, Ill., weighs 10 pounds and has reversible mounting brackets for versatility of motor installation.

Check No. 17 on Reply Card for more Details

PRODUCTION RECORDER: Made by Post Machinery Co., Beverly, Mass., the new electronic counter records the count in quantities of 25 or 50 on a totalizer and may be adapted to count in odd amounts. Rate meter records the production of the machine in thousands of units per hour and where count is in excess of 100,000 per hour, meter switch is pressed so that reading may be observed on the 100,000 to 200,000 dial.

Check No. 18 on Reply Card for more Details

BORING HEADS: Incorporating dovetail slide and extended jaw or tool holder, two new boring heads for small jig borers, turret lathes and light milling machines are offered by Flynn Mfg. Co., Detroit 26, Mich. Model 24 is designed to hold cutting tools in vertical position and model 25 holds cutting tools in vertical and horizontal positions.

Check No. 19 on Reply Card for more Details

CHISELS: Made of an alloy tool steel, the new chisels offered by Arrow Tools Inc., Chicago 23, Ill., have a hardened cutting edge. They are designated as Super-tuf chisels.

Check No. 20 on Reply Card for more Details

ACCESSORY CABINET: An assortment of lathe tool accessories, including high speed cutters, cutting off blades, light boring bars and set screws, are contained in the accessory cabinet offered by J. H. Williams & Co., Buffalo 7, N. Y. Contents of each drawer are identified outside as well as inside.

Check No. 21 on Reply Card for more Details

FOR PNEUMATIC OPERATIONS: For utilization in precision pneumatic operations that require positive conditioning of air or gas, the Liqui-jector has been redesigned by Selas Corp. of America, Philadelphia 34, Pa. Typical applications are in liquid separation, agitation, drying, spraying, instruments and pneumatic mechanisms. It also acts as a filter, removing atmospheric dirt and finely divided solid particles.

Check No. 22 on Reply Card for more Details

CORROSION RESISTANT COATING: Known as the V-200 series, Specialty Coatings Laboratory, Milwaukee 2, Wis., has developed plastic base coatings to protect chemical or processing equipment from strong corrosive fumes. They are available in clear or colors and may be applied by spray, dip or brush.

Check No. 23 on Reply Card for more Details

PERMANENTLY LUBRICATED: Manufactured in ½, ⅝, ¾ and 1-inch bore sizes, the new Lubralife pillow blocks developed by Congress Drives Division, Tann Corp., Detroit 34, Mich., are designed to handle heavy loads and high speeds. A cavity filled with sponge iron acting as a wick, plus the high porosity of the bearing metal itself insures adequate lubrication for life of the bearing.

Check No. 24 on Reply Card for more Details

WELDING SHIELD: Industrial Products Co., Philadelphia 33, Pa., announces a new welding shield designed for getting into offset or close places where welder cannot normally see to make the necessary weld. It is a conventional type of fiber shield to which a form of periscope has been adopted.

Check No. 25 on Reply Card for more Details

FLOW METERS: A new line of mercury manometer flow meters is announced by Fischer & Porter Co., Hatboro, Pa. They use the company's magnetic clutch or impedance bridge electric transmitter. Meters are available in several models.

Check No. 26 on Reply Card for more Details

OPENS DOORS: Designed for many signaling and operating functions in industrial plants, a magnetic switch is offered by Nu-Way Signal Co., Chicago 51, Ill. Truck passing over it, energizes it to ring a bell or sound a signal to summon attendant. It may also be used to open doors automatically.

Check No. 27 on Reply Card for more Details

LIGHTWEIGHT REFRACTORY: Known as H-W 56 Lightweight Castable, a new refractory developed by Harbison-Walker Refractories Co., Pittsburgh 22, Pa., is lighter than water and with the skin surfaces sealed, will float. It may be used safely in temperatures up to 2000° F. It is recommended for furnace walls, boiler settings, ducts, breeching linings, etc.

Check No. 28 on Reply Card for more Details

ADJUSTABLE DRILLING HEAD: A fully adjustable drilling head, available from Errington Mechanical Laboratory Inc., Staten Island 4, N. Y., can drill in squares, rectangles, triangles and irregular patterns. Heads are made with three, four and six spindles; sizes from 0-¼-inch, from 3/16-inch to ½-inch and No. 2M.T. socket capacity.

Check No. 29 on Reply Card for more Details

FOR MORE INFORMATION
on the new products and equipment in this section, fill in a card. It will receive prompt attention.

Market Summary

CONSUMER pressure for finished steel is taxing production facilities. Although steel is pouring from the furnaces in the greatest volume in history, producers are making little progress clearing away the huge order accumulations on their books. Deliveries now extend months ahead on virtually all the major products. Supply conditions are tightening steadily. Some consumers, already desperate for light, flat-rolled steel, are paying premium prices to obtain sufficient metal to support expanding manufacturing schedules. High-cost conversion tonnage demand is rising. In some respects, current market conditions are reminiscent of those prevailing during the shortage immediately after the war.

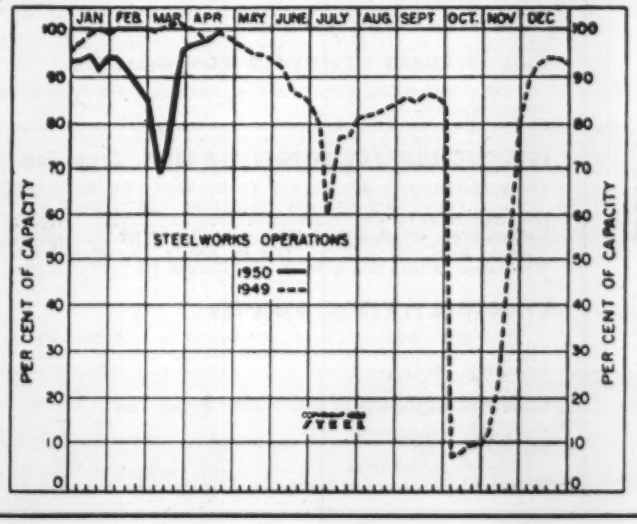
OUTLOOK— Generally, sellers have not formally opened third quarter order books. But some have accepted specifications for the period from regular customers on other than light, flat-rolled tonnage. These bookings, along with indicated heavy carryover in sheets and strip from second quarter, are expected to support steelmaking close to capacity into August, barring order cancellations in event of serious automotive labor trouble. Except for possible loss of tonnage because of vacation curtailments, prospects are production over the next few months will break all previous records. Pressure for sheets is so great producers fear they would be swamped with tonnage were they to formally open books now for third quarter.

OPERATIONS— Ingot operations are booming along at capacity pace. Last week the national rate rose 2 points to 100 per cent, equivalent to production of 1,906,267 net tons based on annual capacity of 99,392,800 net tons. This compares with capacity of 96,120,930 tons last year, 95,505,280 in 1945 and 81,619,496 in 1941. Operations currently are not uniformly at 100 per cent in all districts. Areas engaged above 100 per cent of practical capacity, however, more than offset those operating below that level. Last week increases were reported at Wheeling, up 2 points to 104.5 per cent, Cincinnati, 1 point to 103, and Detroit, 2 points to 104.

DEMAND— Expansion of manufacturing activities is exceeding expectations and is giving rise to much heavier demand than the steelmakers can immediately satisfy. How much of current tonnage moving to consumers is going into inventory is a matter for speculation. In the light, flat-rolled products it is not believed any tonnage of consequence is being stockpiled except that moving to the strikebound Chrysler plants. Automotive demand appears insatiable. Miscellaneous manufacturing and building, however, are rising, calling for steel in increasing volume. This is reflected in further extension of deliveries on bars, plates, shapes and such specialties as stainless and electrical steel.

PRICES— No price changes of note have been effected in the steel markets since early in the year. None appears in immediate prospect. However, steel costs of many consumers are rising as they turn to use of premium-priced conversion steel to satisfy their requirements. STEEL's weighted index of finished steel prices is unchanged at 156.13 as is the arithmetical price composite at $93.18. Price composites on pig iron are steady at $46.47 on No. 2 foundry, $45.97 on basic, and $47.27 on malleable.

SCRAP— Decidedly bullish tone has developed in the scrap markets with the steel mills taking in larger tonnage and the outlook promising for heavy steelmaking operations over coming months. STEEL's price composite on steelmaking grades of scrap rose last week to $29.50 from $29.08 the preceding week, establishing a new high since mid-November. A year ago this composite stood at $24.08. An interesting development in this market is proposed importation of several cargoes of scrap by a leading eastern steelmaker, most of it from Europe.



DISTRICT STEEL RATES

Percentage of Ingot Capacity Engaged in Leading Districts

	Week Ended Apr. 22	Change	Same Week 1949	Same Week 1948
Pittsburgh	100.5	— 0.5*	98.5	80
Chicago	102.5	— 0.5*	101	85
Eastern Pa.	93	0	93	68
Youngstown	105	0	105	51
Wheeling	104.5	+ 2	95.5	72
Cleveland	99	— 0.5	100.5	95.5
Buffalo	104	0	104	64
Birmingham	100	0	100	71
New England	85	— 2	80	80
Cincinnati	103	+ 1	106	52
St. Louis	80	— 4.5	84.5	85
Detroit	104	+ 2*	111	101
Western	93	— 2	97.5	..
Estimated national rate	100	+ 2	99	75.5

Based on weekly steelmaking capacity of 1,906,267 net tons for 1950; 1,843,516 net tons for 1949; 1,802,476 net tons for 1948.
*Change from revised rate.

Composite Market Averages

	Apr. 20 1950	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
FINISHED STEEL INDEX, Weighted:					
Index (1935-39 av.=100)	156.13	156.13	156.13	154.01	100.65
Index in cents per lb...	4.230	4.230	4.230	4.172	2.727
ARITHMETICAL PRICE COMPOSITES:					
Finished Steel, NT	$93.18	$93.18	$93.18	$94.45	$57.55
No. 2 Fdry Pig Iron, GT	46.47	46.47	46.47	46.57	24.67
Basic Pig Iron, GT.....	45.97	45.97	45.97	46.10	24.00
Malleable Pig Iron, GT..	47.27	47.27	47.27	47.27	25.29
Steelmaking Scrap, GT..	29.50	29.08	28.66	23.42	19.17

Weighted finished steel index based on average shipments and prices of the following 14 representative products during 5-year base period 1935-39: Structural shapes, plates, rails, hot-rolled and cold-finished bars, pipe, wire, nails, tin plate, hot and cold-rolled sheets, galvanized sheets, hot and cold-rolled strip. For complete explanation see STEEL, Sept. 19, 1949, p. 54.

Arithmetical steel price composite based on same products as the weighted finished steel index with the exception of rails, cold-finished bars, galvanized sheets and hot-rolled strip.

Basic and No. 2 foundry pig iron composites are based on average prices at Pittsburgh, Bethlehem, Birmingham, Buffalo, Chicago, Cleveland, Granite City, Youngstown. Malleable composite based on same points, except Birmingham.

Steelmaking scrap composite based on average prices of No. 1 heavy melting steel at Pittsburgh, Chicago and Philadelphia.

Comparison of Prices

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED MATERIALS

	Apr. 20 1950	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Bars, H.R., Pittsburgh	3.45	3.45	3.45	3.35	2.15
Bars, H.R., Chicago	3.45	3.45	3.45	3.35	2.15
Bars, C.F., Pittsburgh	4.10–15	4.10–15	4.10–15	3.95	2.65
Shapes, Std., Pittsburgh ..	3.40	3.40	3.40	3.25	2.10
Shapes, Std., Chicago	3.40	3.40	3.40	3.25	2.10
Plates, Pittsburgh	3.50	3.50	3.50	3.50	2.20
Plates, Chicago	3.50	3.50	3.50	3.40	2.20
Plates, Coatesville, Pa. ..	3.60	3.60	3.60	3.50	2.20
Plates, Sparrows Point, Md.	3.50	3.50	3.50	3.45	2.20
Plates, Claymont, Del. ...	3.60	3.60	3.60	3.65	2.20
Sheets, H.R., Pittsburgh ..	3.35	3.35	3.35	3.25	2.20
Sheets, H.R., Chicago ....,3.35		3.35	3.35	3.25	2.20
Sheets, C.R., Pittsburgh ..	4.10	4.10	4.10	4.00	3.05
Sheets, C.R., Chicago	4.10	4.10	4.10	4.00	3.05
Sheets, C.R., Detroit	4.30	4.30	4.30	4.20	3.15
Sheets, Galv., Pittsburgh .	4.40	4.40	4.40	4.40	3.65
Strip, H.R., Pittsburgh ...	3.25	3.25	3.25	3.50	2.10
Strip, H.R., Chicago	3.25	3.25	3.25	3.25	2.10
Strip, C.R., Pittsburgh ...	4.15	4.15	4.15	4.00–75	2.80
Strip, C.R., Chicago	4.30	4.30	4.30	4.00–.15	2.90
Strip, C.R., Detroit	4.35–40	4.35–40	4.35–40	4.20–50	2.90
Wire, Basic, Pittsburgh ..	4.50	4.50	4.50	4.15	2.60
Nails, Wire, Pittsburgh...	5.30	5.30	5.30	5.15	2.80
Tin plate, box, Pittsburgh.	$7.50	$7.50	$7.50	$7.75	$5.00

SEMIFINISHED

Billets, forging, Pitts. (NT)	$63.00	$63.00	$63.00	$61.00	$40.00
Sheet bar, mill (NT)	57.00–58.00	57.00–58.00	57.00–58.00	67.00	34.00
Wire rods, $\frac{7}{32}$-$\frac{9}{16}$", Pitts...	3.85	3.85	3.85	3.775	2.00

PIG IRON, Gross Ton

Bessemer, Pitts.	$47.00	$47.00	$47.00	$47.00	$25.50
Basic, Valley	46.00	46.00	46.00	46.00	24.50
Basic, del. Phila.	49.44	49.44	49.44	49.39	26.34
No. 2 Fdry, Pitts.	46.50	46.50	46.50	46.50	25.00
No. 2 Fdry, Chicago	46.50	46.50	46.50	46.25	25.00
No. 2 Fdry, Valley	46.50	46.50	46.50	46.50	25.00
No. 2 Fdry, del. Phila. ..	49.94	49.94	49.94	49.89	26.84
No. 2 Fdry, Birm.	42.38	42.38	42.38	43.38	21.38
No. 2 Fdry. (Birm.) del. Cin.	49.08	49.08	49.08	49.43	25.06
Malleable, Valley	46.50	46.50	46.50	46.50	25.00
Malleable, Chicago	46.50	46.50	46.50	46.50	25.00
Charcoal, Lyles, Tenn. ...	60.00	60.00	60.00	66.00	33.00
Ferromanganese, Etna, Pa.	175.00	175.00	175.00	175.00	140.33*

* Delivered, Pittsburgh.

SCRAP, Gross Ton

No. 1 Heavy Melt. Pitts...	$33.00	$32.25	$32.00	$25.00	$20.00
No. 1 Heavy Melt. E. Pa..	26.00	26.00	25.00	22.75	18.75
No. 1 Heavy Melt. Chicago	29.50	29.00	29.00	22.50	18.75
No. 1 Heavy Melt. Valley..	33.75	32.75	31.75	22.00	20.00
No. 1 Heavy Melt. Cleve. .	30.25	29.25	28.25	20.00	19.50
No. 1 Heavy Melt. Buffalo	29.75	29.75	28.25	23.50	19.25
Rails, Rerolling, Chicago..	46.50	46.50	45.50	31.00	22.25
No. 1 Cast, Chicago	42.50	41.00	41.00	29.50	20.00

COKE, Net Ton

Beehive, Furn., Connlsvl...	$14.25	$14.25	$14.25	$14.50	$7.00
Beehive, Fdry., Connlsvl...	16.00	16.00	16.00	17.00	7.75
Oven Fdry., Chicago	21.00	21.00	21.00	20.40	13.35

NONFERROUS METALS

Copper, del. Conn.	18.50	18.50	18.50	21.50	12.00
Zinc, E. St. Louis.....	10.50	10.50	10.00	13.00	8.25
Lead, St. Louis	10.30	10.30	10.30	14.825	6.35
Tin, New York	77.00	76.50	76.25	103.00	52.00
Aluminum, del.	17.00	17.00	17.00	17.00	15.00
Antimony, Laredo, Tex. ..	24.50	24.50	24.50	38.50	14.50
Nickel, refinery, duty paid.	40.00	40.00	40.00	40.00	35.00

Pig Iron

For key to producing companies, turn next page.
Minimum delivered prices do not include 3% federal tax.

PIG IRON, Gross Ton

	Basic	No. 2 Foundry	Malleable	Bessemer
Bethlehem, Pa. B2	$48.00	$48.50	$49.00	$49.50
Newark, del.	50.63	51.13	51.63	52.13
Brooklyn, N.Y., del.	....	52.79	53.29	....
Birmingham District				
Birmingham R2	41.88	42.38	....	....
Birmingham S9	41.88	42.38	....	....
Woodward, Ala. W15	41.88	42.38	....	....
Cincinnati, del.	....	49.08	....	....
Buffalo District				
Buffalo H1, R2	46.00	46.50	47.00	....
Tonawanda, N.Y., W12	46.00	46.50	47.00	....
N. Tonawanda, N.Y., T9	....	46.50	47.00	....
Boston, del.	55.26	55.76	56.20	....
Rochester, N.Y., del.	48.63	49.13	49.63	....
Syracuse, N.Y., del.	49.58	50.08	50.58	....
Chicago District				
Chicago I-3	46.00	46.50	46.50	47.00
Gary, Ind. C3	46.00	....	46.50	....
Indiana Harbor, Ind. I-2	46.00	....	46.50	....
So. Chicago, Ill. W14 Y1	46.00	46.50	46.50	....
So. Chicago, Ill. C3	46.00	....	46.50	47.00
Milwaukee, del.	47.89	48.39	48.39	48.89
Muskegon, Mich., del.	....	51.98	51.98	....
Cleveland District				
Cleveland A7	46.00	46.50	46.50	47.00
Cleveland R2	46.00	46.50	46.50	....
Akron, del. from Cleve.	48.39	48.89	48.89	49.39
Lorain, O. N3	46.00	....	....	47.00
Duluth I-3	....	....	46.50	....
Erie, Pa. I-3	46.00	46.50	46.50	47.00
Everett, Mass. E1	....	50.50	51.00	....
Fontana, Calif. K1	52.00	52.50	....	....
Geneva, Utah G1	46.00	46.50	....	....
Seattle, Tacoma, Wash., del.	....	54.20	....	....
Portland, Oreg., del.	....	54.20	....	....
Los Angeles, San Francisco, del. ...	53.70	54.20	....	....
Granite City, Ill. M10	47.90	48.40	48.90	....
St. Louis, del. (incl. tax).....	48.65	49.15	49.65	....
Ironton, Utah C11	46.00	46.50	....	....
Minnequa, Colo. C10	47.00	47.50	47.50	....
Pittsburgh District				
Neville Island, Pa. P6	46.00	46.50	46.50	47.00
Pitts, N.&S. sides, Ambridge, Aliquippa, del.	47.19	47.69	47.69	48.19
McKeesRocks, del.	46.95	47.45	47.45	47.95
Lawrenceville, Homestead, McKeesport, Monaca, del.	47.44	47.94	47.94	48.44
Verona, del.	47.90	48.40	48.40	48.90
Brackenridge, del.	48.13	48.63	48.63	49.13
Bessemer, Pa. C3	46.00	....	46.50	47.00
Clairton, Rankin, So. Duquesne, Pa. C3	46.00	....	....	....
McKeesport, Pa. N3	46.00	....	....	47.00
Sharpsville, Pa. S6	46.00	46.50	46.50	47.00
Steelton, Pa. B2	48.00	48.50	49.00	49.50
Steubenville, O. W10	46.00	....	....	....
Struthers, O. S16	46.00	....	....	....
Swedeland, Pa. A3	48.00	48.50	49.00	49.50
Philadelphia, del.	49.44	49.94	50.44	50.94
Toledo, O. I-3	46.00	46.50	46.50	47.00
Cincinnati, del.	51.01	51.51	....	....
Troy, N.Y., R2	48.00	48.50	49.00	49.50
Youngstown District				
Hubbard, O. Y1	46.00	46.50	46.50	....
Youngstown C3	46.00	....	....	47.00
Youngstown Y1	46.00	46.50	46.50	47.00
Mansfield, O. del.	50.26	50.76	50.76	51.26

PIG IRON DIFFERENTIALS

Silicon: Add 50 cents per ton for each 0.25% Si over base grade, 1.75-2.25%.

Phosphorous: Deduct 38 cents per ton for P content of 0.70% and over.

Manganese: Add 50 cents per ton for each 0.50% manganese over 1%, or portion thereof.

Nickel: Under 0.50% no extra; 0.50-0.74%, incl., add $2 per ton and each additional 0.25%, add $1 per ton.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.00-6.50% silicon; add $1 for each 0.5% Si to 11.50%)

Jackson, O. G2, J1	$57.00
Buffalo H1	53.25

ELECTRIC FURNACE SILVERY PIG IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1 for each 0.5% Mn over 1%; $1 for 0.045% max. P)

Niagara Falls, N.Y. P15	$71.50
Keokuk, Iowa, Openhearth & Fdry, frt. allowed K2	77.00
Keokuk, Iowa, OH & Fdry., 12½ lb. pigiets, frt. allowed K2.	82.00
Wenatchee, Wash., OH & Fdry, frt. allowed K2	77.00

CHARCOAL PIG IRON, Gross Ton

(Low phos. semi-cold blast; differential charged from silicon over base grade; also for hard chilling iron Nos. 5 x 6)

Lyles Tenn. T3	$60.00

LOW PHOSPHOROUS PIG IRON, Gross Ton

Cleveland, intermediate, A7	$51.00
Steelton, Pa. B2	54.00
Philadelphia delivered	57.00
Troy, N.Y. R2	54.00

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Semifinished and Finished Steel Products

Mill prices as reported to STEEL. Apr. 20. 1950; cents per pound unless otherwise noted. Changes shown in italics.
Code numbers following mill points indicate producing company; key on next two pages.

INGOTS, Carbon, Forging (NT)
Detroit R7 .....$50.00
Munhall,Pa. C3 .....50.00

INGOTS, Alloy (NT)
Detroit R7 .....$51.00
Houston,Tex. S5 .....59.00
Midland,Pa. C18 .....51.00
Munhall,Pa. C3 .....51.00
SoDuquesne,Pa. C3 ..51.00

BILLETS, BLOOMS & Slabs Carbon, Rerolling (NT)
Bessemer,Pa. C3 ....$53.00
Clairton,Pa. C3 .....53.00
Conshohocken,Pa. A3 .58.00
Ensley,Ala. T2 .....53.00
Fairfield,Ala. T2 .....53.00
Fontana,Cal. K1 .....72.00
Gary,Ind. C3 .....53.00
Johnstown,Pa. B2 .....53.00
Lackawanna,N.Y. B2..53.00
Munhall,Pa. C3 .....53.00
Sharon,Pa. S3 .....57.00
SoChicago,Ill. C3 .....53.00
So.Duquesne,Pa. C3 ..53.00

Carbon, Forging (NT)
Bessemer,Pa. C3 ....$63.00
Buffalo R2 .....63.00
Canton,O. R2 .....63.00
Clairton,Pa. C3 .....63.00
Cleveland R2 .....63.00
Conshohocken,Pa. A3..65.00
Detroit R7 .....63.00
Ensley,Ala. T2 .....63.00
Fairfield,Ala. T2 .....63.00
Fontana,Calif. K1 ....85.00
Gary,Ind. C3 .....63.00
Geneva, Utah G1 .....63.00
Houston,Tex. S5 .....71.00
Ind.Harbor,Ind. I-2 ...63.00
Johnstown,Pa. B2 ....63.00
Lackawanna,N.Y. B2 ..63.00
Los Angeles B3 .....82.00
Munhall,Pa. C3 .....63.00
Seattle B3 .....82.00
So.Chicago C3,R2,W14..63.00
So.Duquesne,Pa. C3 ...63.00
So.SanFrancisco B3 ...82.00
Warren,O. C17 .....63.00

Alloy (NT)
Bethlehem,Pa. B2 ....$66.00
Buffalo R2 .....66.00
Canton,O. R2, T7 ....66.00
Conshohocken,Pa. A3..68.00
Detroit R7 .....66.00
Fontana,Calif. K1 ....85.00
Gary,Ind. C3 .....66.00
Houston,Tex. S5 .....74.00
Ind.Harbor,Ind. Y1 ...66.00
Johnstown,Pa. B2 ....66.00
Lackawanna,N.Y. B2 ..66.00
LosAngeles B3 .....86.00
Massillon,O. R2 .....66.00
Midland,Pa. C18 .....66.00
Munhall,Pa. C3 .....66.00
Sharon,Pa. S3 .....66.00
So.Chicago C3,R2,W14..66.00
So.Duquesne,Pa. C3 ..66.00
Warren,O. C17 .....66.00
Youngstown Y1 .....66.00

SHEETS BARS (NT)
Mansfield,O. E6 .....$58.00
Sharon,Pa. S3 .....57.00

ROUNDS, SEAMLESS TUBE (NT)
Canton,O. R2 .....$76.00
Cleveland R2 .....76.00
Ind.Harbor, Ind. I-2 ...76.00
Massillon,O. R2 .....76.00
So.Chicago,Ill R2 ....76.00

SKELP
Aliquippa,Pa. J5 .....3.25
Munhall,Pa. C3 .....3.15
Warren,O R2 .....3.15
Youngstown C3, R2 ...3.15

WIRE RODS
AlabamaCity,Ala. R2 ..3.85
Buffalo W12 .....3.85
Cleveland A7 .....3.85
Donora,Pa. A7 .....3.85
Fairfield,Ala. T2 .....3.85
Houston Tex. S5 .....4.25
Ind.Harbor,Ind. Y1 ....3.85
Johnstown,Pa. B2 .....3.85
Joliet,Ill. A7 .....3.85
LosAngeles B3 .....4.65
Minnequa,Colo. C10 ...4.10
Monessen,Pa. P7 .....3.85
No.Tonawanda,N.Y. B11..4.10
Pittsburg,Calif. C11 ...4.50
Portsmouth,O. P12 ....3.85
Roebling,N.J R5 .....3.95
So.Chicago,Ill. R2 ....3.85
SparrowsPoint B2 .....3.95
Sterling,Ill.(1) N15 ....3.85
Struthers,O. Y1 .....3.85
Torrance,Calif. C11 ....4.65

STRUCTURALS
Carbon Steel Stand. Shapes
Aliquippa,Pa. J5 .....3.40
Bessemer,Ala. T2 .....3.40
Bethlehem,Pa. B2 .....3.45
Clairton,Pa. C3 .....3.40
Fairfield,Ala. T2 .....3.40
Fontana,Calif. K1 .....4.00
Gary,Ind. C3 .....3.40
Geneva,Utah G1 .....3.40
Houston, Tex. S5 .....3.80
Ind.Harbor,Ind. I-2 ...3.40
Johnstown,Pa. B2 .....3.45
KansasCity,Mo. S5 ....4.00
Lackawanna,N.Y. B2 ..3.45
Los Angeles B3 .....4.00
Minnequa,Colo. C10 ...3.75
Munhall,Pa. C3 .....3.40
Niles,Calif.(22) P1 ....4.02
Phoenixville,Pa. P4 ....3.30
Portland,Oreg. O4 .....3.90
Seattle B3 .....4.05
So.Chicago,Ill. C3, W14..3.40
So.SanFrancisco B3 ...3.95
Torrance,Calf. C11 ...4.00
Weirton,W.Va. W6 ....3.40

Alloy Stand. Shapes
Clairton,Pa. C3 .....4.05
Fontana,Calif. K1 .....5.25
Munhall,Pa. C3 .....4.05
So.Chicago,Ill. C3 .....4.05

H.-S. Low-Alloy Stand. Shapes
Aliquippa,Pa. J5 .....5.15
Bessemer,Ala. T2 .....5.15
Bethlehem,Pa.(14) B2..5.20
Clairton,Pa. C3 .....5.15
Fairfield,Ala. T2 .....5.15
Fontana,Calif. K1 .....5.75
Gary,Ind. C3 .....5.15
Ind.Harbor,Ind. I-2, Y1..5.15
Johnstown,Pa. B2 .....5.20
Lackawanna,N.Y.(14)B2 5.20
Munhall,Pa. C3 .....5.15
So.Chicago,Ill. C3 .....5.15
Struthers,O. Y1 .....5.15

Wide Flange
Bethlehem,Pa. B2 .....3.45
Lackawanna,N.Y. B2 ..3.45
Munhall,Pa. C3 .....3.40
So.Chicago,Ill. C3 .....3.40

H.-S., L-A Wide Flange
Munhall,Pa. C3 .....5.10
So.Chicago,Ill. C3 .....5.10

SHEET STEEL PILING
Ind.Harbor,Ind. I-2 ...4.20
Lackawanna,N.Y. B2 ..4.20
Munhall,Pa. C3 .....4.20
So.Chicago,Ill. C3 .....4.20
Weirton,W.Va. W6 ....4.20

PLATES, Carbon Steel
AlabamaCity,Ala. R2 ..3.50
Aliquippa,Pa. J5 .....3.50
Ashland,Ky.(15) A10 ..3.50
Bessemer,Ala. T2 .....3.50
Clairton,Pa. C3 .....3.50
Claymont,Del. W16 ....3.60
Cleveland J5, R2 .....3.50
Coatesville,Pa. L7 .....3.60
Conshohocken,Pa. A3 ..3.60
Ecorse,Mich. G5 .....3.75
Fairfield,Ala. T2 .....3.50
Fontana,Calif. K1 .....4.10
Gary,Ind. C3 .....3.50
Geneva,Utah G1 .....3.50
Harrisburg,Pa. C5 .....3.50
Houston,Tex. S5 .....3.90
Ind.Harbor,Ind. I-2, Y1..3.50
Johnstown,Pa. B2 .....3.50
Lackawanna,N.Y. B2 ..3.50
Minnequa,Colo. C10 ....4.30
Munhall,Pa. C3 .....3.50
Pittsburgh J5 .....3.50
Seattle B3 .....4.40
Sharon,Pa. S3 .....3.50
So.Chicago,Ill. C3, W14..3.50
SparrowsPoint,Md. B2..3.50
Steubenville,O. W10 ...3.50
Warren,O. R2 .....3.50
Weirton,W.Va. W6 ....3.50
Youngstown C3, R2, Y1..3.50

PLATES (Universal Mill)
Fontana,Calf. K1 .....4.40

PLATES, Carbon A.R.
Fontana,Calif. K1 .....5.25

PLATES, Open-Hearth Alloy
Coatesville,Pa. L7 .....4.50
Conshohocken,Pa. A3 ..4.40
Fontana,Calif. K1 .....5.40
Gary,Ind. C3 .....4.40
Johnstown,Pa. B2 .....4.40
Munhall,Pa. C3 .....4.40
Sharon,Pa. S3 .....4.40
So.Chicago,Ill. C3 .....4.40
SparrowsPoint,Md. B2..4.40

PLATES, Wrought Iron
Economy,Pa. B14 .....7.85

PLATES,High-Strength Low-Alloy
Aliquippa,Pa. J5 .....5.35
Bessemer,Ala. T2 .....5.35
Clairton,Pa. C3 .....5.35
Cleveland J5, R2 .....5.35
Conshohocken,Pa. A3 ..5.35
Ecorse,Mich. G5 .....5.60
Fairfield,Ala. T2 .....5.35
Fontana,Calif. K1 .....5.95
Gary,Ind. C3 .....5.35
Geneva,Utah G1 .....5.35
Houston,Tex. S5 .....5.60
Ind.Harbor,Ind. I-2, Y1..5.35
Johnstown,Pa. B2 .....5.35
Munhall,Pa. C3 .....5.35
Pittsburgh J5 .....5.35
Sharon,Pa. S3 .....5.35
So.Chicago,Ill. C3 .....5.35
SparrowsPoint,Md. B2 ..5.35
Warren,O. R2 .....5.35
Youngstown Y1 .....5.35

FLOOR PLATES
Cleveland J5 .....4.55
Conshohocken,Pa. A3 ..4.55
Harrisburg,Pa. C5 .....4.55
Ind.Harbor,Ind. I-2 ....4.55
Munhall,Pa. C3 .....4.55
So.Chicago,Ill. C3 .....4.55

PLATES, Ingot Iron
Ashland,c.l. (15) A10 ..3.75
Ashland,lcl(15) A10 ..4.25
Cleveland,cl R2 .....4.10
Warren,O. cl R2 .....4.10

BARS, Hot-Rolled Carbon
AlabamaCity,Ala. R2 ..3.45
Aliquippa,Pa. J5 .....3.45
Alton,Ill.(1) L1 .....3.45
Ashland,Ky.(17) A10 ..3.45
Atlanta,Ga. A11 .....3.60
Bessemer,Ala. T2 .....3.45
Buffalo R2 .....3.45
Canton,O. R2 .....3.45
Clairton,Pa. C3 .....3.45
Cleveland R2 .....3.45
Ecorse,Mich. G5 .....3.65
Emeryville,Calif. J7 ....4.20
Fairfield,Ala. T2 .....3.45
Fontana,Calif. K1 .....4.10
Gary,Ind. G3 .....3.45
Houston,Tex. S5 .....3.85
Ind.Harbor,Ind. I-2, Y1..3.45
Johnstown,Pa. B2 .....3.45
KansasCity,Mo. S5 ....4.05
Lackawanna,N.Y. B2 ..3.45
Los Angeles B3 .....4.15
Marion,O. P11 .....3.35
Midland,Pa. C18 .....3.45
Milton,Pa. B6 .....3.45
Minnequa,Colo. C10 ...3.85
Niles,Calif. P1 .....4.17
N.Tonawanda,N.Y. B11..3.45
Pittsburg,Calif. C11 ...4.15
Pittsburgh J5 .....3.45
Portland,Oreg. O4 .....4.20
Seattle B3, N14 .....4.20
So.Chicago C3, R2, W14..3.45
So.Duquesne,Pa. C3 ...3.45
S.SanFran.,Cal. B3 ....4.20
Struthers,O. Y1 .....3.45
Torrance,Calif. C11 ....4.15
Weirton,W.Va. W6 ....3.45
Youngstown C3, R2 ....3.45

BAR SIZE ANGLES; S. SHAPES
Aliquippa,Pa. J5 .....3.45
Atlanta A11 .....3.60
Johnstown,Pa. B2 .....3.45
Lackawanna,N.Y. B2 ..3.45
Niles,Calif. P1 .....4.17
Pittsburgh(23) J5 .....3.45
Portland,Oreg. O4 .....4.20
SanFrancisco S7 .....4.00
Weirton,W.Va. W6 ....3.45

BAR SIZE ANGLES; H.R.CARBON
Bethlehem,Pa. B2 .....3.65

BARS, Hot-Rolled Alloy
Bethlehem,Pa. B2 .....3.95
Buffalo R2 .....3.95
Canton,O. R2, T7 .....3.95
Clairton,Pa. C3 .....3.95
Ecorse,Mich. G5 .....4.25
Fontana,Calif. K1 .....4.95
Gary,Ind. C3 .....3.95
Houston,Tex. S5 .....4.35
Ind.Harbor,Ind. I-2, Y1..3.95
Johnstown,Pa. B2 .....3.95
KansasCity,Mo. S5 ....4.55
Lackawanna,N.Y. B2 ..3.95
Los Angeles B3 .....5.00
Massillon,O. R2 .....3.95
Midland,Pa. C18 .....3.95
So.Chicago C3, R2, W14..3.95
So.Duquesne,Pa. C3 ...3.95
Struthers,O. Y1 .....3.95
Warren,O. C17 .....3.95
Youngstown C3 .....3.95

BARS, Hot-Rolled Ingot Iron
Ashland,Ky.(17) A10 ..3.70

BARS & SMALL SHAPES, H.R., High-Strength Low-Alloy
Aliquippa,Pa. J5 .....5.20
Bessemer,Ala. T2 .....5.20
Bethlehem,Pa. B2 .....5.20
Clairton,Pa. C3 .....5.20
Cleveland R2 .....5.20
Ecorse,Mich. G5 .....5.40
Fairfield,Ala. T2 .....5.20
Fontana,Calif. K1 ....6.25
Gary,Ind. C3 .....5.20
Ind.Harbor,Ind. I-2, Y1..5.20
Johnstown,Pa. B2 .....5.20
Lackawanna,N.Y. B2 ..5.20
Pittsburgh J5 .....5.20
So.Duquesne,Pa. C3 ...5.20
Struthers,O. Y1 .....5.20
Youngstown C3 .....5.20

BARS, Cold-Finished Carbon
Aliquippa,Pa. K5 .....4.15
Ambridge,Pa. W18 ....4.15
BeaverFalls,Pa. M12,R2..4.15
Buffalo B5 .....4.15
Camden,N.J. P13 .....4.63
Carnegie,Pa. C12 .....4.15
Chicago W18 .....4.15
Cleveland A7, C20 .....4.15
Detroit P17 .....4.30
Donora,Pa. A7 .....4.15
Ecorse,Mich. G5 .....4.35
Elyria,O. W8 .....4.15
FranklinPark,Ill. N5 ..4.15
Gary,Ind. R2 .....4.15
Hammond,Ind. L2, M13..4.15
Hartford,Conn. R2 ....4.55
Harvey,Ill. B5 .....4.15
LosAngeles R2 .....5.55
Mansfield,Mass. B5 ....4.55
Massillon,O. R2, R8 ...4.15
Midland,Pa. C18 .....4.15
Monaca,Pa. S17 .....4.15
Newark,N.J. W18 .....4.55
Plymouth,Mich. P5 ....4.40
Pittsburg J5 .....4.10
Putnam,Conn. W18 ....4.55
Readville,Mass. C14 ....4.55
St.Louis,Mo. M5 .....4.55
So.Chicago,Ill. W14 ....4.15
SpringCity,Pa.(5) K3 ..4.55
Struthers,O. Y1 .....4.15
Waukegan,Ill. A7 .....4.15
Youngstown F3, Y1 ....4.15

BARS, Cold-Finished Alloy
Aliquippa,Pa. K5 .....4.90
Ambridge,Pa. W18 ....4.90
BeaverFalls,Pa. M12 ..4.90
Bethlehem,Pa. B2 .....4.90
Buffalo B5 .....4.90
Canton,O. R2, T7 .....4.90
Carnegie,Pa. C12 .....4.90
Chicago W18 .....4.90
Cleveland A7, C20 .....4.90
Detroit P17 .....5.05
Donora,Pa. A7 .....4.90
Elyria,O. W8 .....4.90
Gary,Ind. R2 .....4.90
Hammond,Ind. L2, M13..4.90
Hartford,Conn. R2 ....5.20
Harvey,Ill. B5 .....4.90
Lackawanna,N.Y. B2 ..4.90
Mansfield,Mass. B5 ....5.20
Massillon,O. R2, R8 ...4.90
Midland,Pa. C18 .....4.90
Monaca,Pa. S17 .....4.90
Newark,N.J. W18 .....5.20
Plymouth,Mich. P5 ....5.10
So.Chicago,Ill. R2, W14..4.90
Struthers,O. Y1 .....4.90
Waukegan,Ill. A7 .....4.90
Warren,O. C17 .....4.90
Worcester,Mass. A7 ....5.20
Youngstown F3, Y1 ....4.90

RAIL STEEL BARS
ChicagoHts.,Ill.(3) I-2..3.30
ChicagoHts.,Ill.(4) I-2..3.45
FortWorth,Tex.(26) T4..4.33
Huntngtn,W.Va.(3) W7..3.45
Moline,Ill.(3) R2 .....3.40
SouthAvis,Pa.(2) J8 ...3.30
SouthAvis,Pa.(41) J8 ..3.30
SouthAvis,Pa.(42) J8 ..3.30
Williamsport(2,3) S19 ..3.45

BARS, Wrought Iron
Economy,Pa.(S.R.) B14..9.50
Economy,Pa.(D.R.)B14 11.00
Economy,(Staybolt)B14 11.30
Dover,N.J.(Staybolt)U1 15.00
Dover(Eng. Bolt) U1 ..13.50
Dover(Wrgt.Iron) U1 .12.25
McK.Rks.(S.R.) L5 ....8.60
McK.Rks.(D.R.) L5 ...11.25
McK.Rks.(Staybolt) L5..12.75

BARS, Reinforcing
(Fabricated; to Consumers)
Huntington,W.Va. W7 ..4.50
Johnstown, ¼-1" B2 ..4.35
Los Angeles B3 .....5.00
Marion,O. P11 .....4.25
Seattle B3, N14 .....5.10
SouthAvis,Pa. J8 .....4.35
So.SanFrancisco B3 ...5.00
SparrowsPt., ¼-1" B2 ..4.35
Williamsport,Pa. S19 ..4.35

BARS, Reinforcing (Fabricators)
AlabamaCity,Ala. R2 ..3.45
Alton,Ill.(6) L1 .....3.45
Atlanta,Ga. A11 .....3.60
Buffalo R2 .....3.45
Cleveland R2 .....3.45
Emeryville,Calif. J7 ...4.20
Fairfield,Ala. T2 .....3.45
Fontana,Calif. K1 .....4.10
Gary,Ind. C3 .....3.45
Houston,Tex. S5 .....3.85
Ind.Harbor,Ind. I-2,Y1.3.45
Johnstown,Pa. B2 .....3.45
KansasCity,Mo. S5 ....4.05
Lackawanna,N.Y. B2 ..3.45
Los Angeles B3 .....4.15
Milton,Pa. B6 .....3.45
Minnequa,Colo. C10 ...4.25
Niles,Calif. P1 .....4.17
Pittsburg,Calif. C11 ....4.15
Pittsburgh J5 .....3.45
Portland,Oreg. O4 .....4.20
SandSprings,Okla. S5 ..4.35
Seattle,Wash. B3, N14..4.20
SouthAvis,Pa. J8 .....3.45
So.Chicago,Ill. R2 .....3.45
So.Duquesne,Pa. C3 ....3.45
So.SanFrancisco B3 ....4.20
SparrowsPoint,Md. B2 ..3.45
Struthers,O. Y1 .....3.45
Torrance,Calif. C11 ....4.15
Youngstown C3, R2 ....3.45

BAR SHAPES, Hot-Rolled Alloy
Clairton,Pa. C3 .....4.20
Fontana,Calif. K1 .....4.95
Gary,Ind. C3 .....4.20
Youngstown C3 .....4.20

SHEETS, Hot-Rolled Steel (18 gage and heavier)
AlabamaCity,Ala. R2 ..3.35
Ashland,Ky.(8) A10 ...3.35
Butler,Pa. A10 .....3.35
Cleveland J5, R2 .....3.35
Conshohocken,Pa. A3 ..3.45
Ecorse,Mich.(8) G5 ....3.55
Fairfield,Ala. T2 .....3.35
Fontana,Calif. K1 .....4.25
Gary,Ind. C3 .....3.35
Ind.Harbor,Ind. I-2, Y1..3.35
Irvin,Pa. C3 .....3.35
Lackawanna,N.Y. B2 ..3.35
Munhall,Pa. C3 .....3.35
Niles,O. N12 .....3.50
Niles,O. M4 .....3.75
Pittsburg,Calif. C11 ....4.05
Pittsburgh J5 .....3.35
Sharon,Pa. S3 .....3.35
So.Chicago,Ill. W14 ....3.35
SparrowsPoint,Md. B2 ..3.35
Steubenville,O. W10 ...3.35
Torrance,Calif. C11 ....4.05
Warren,O. R2 .....3.35
Weirton,W.Va. W6 ....3.35
Youngstown C3, Y1 ....3.35

SHEETS, Hot-Rolled Carbon Steel (19 gage and lighter)
AlabamaCity,Ala. R2 ..4.50
Dover,O. R1 .....4.65
Ind.Harbor,Ind. I-2 ....4.40
Mansfield,O. E6 .....4.15
Niles,O. N12 .....4.10
Niles,O. M4 .....4.65
Torrance,Calif. C11 ....5.15

SHEETS, H-R (14 ga., heavier) High-Strength Low-Alloy
Cleveland J5, R2 .....5.05
Conshohocken,Pa. A3 ..5.05
Ecorse,Mich. G5 .....5.25
Fairfield,Ala. T2 .....5.05
Fontana,Calf. K1 .....6.74
Gary,Ind. C3 .....5.05
Ind.Harbor,Ind. I-2, Y1..5.05
Irvin,Pa. C3 .....5.05
Lackawanna(35) B2 ....5.05
Pittsburgh J5 .....5.05
Sharon,Pa. S3 .....5.05
So.Chicago,Ill. C2 .....5.05
SparrowsPoint(36) B2 ..5.05
Warren,O. R2 .....5.05
Weirton,W.Va. W6 ....5.05
Youngstown, C3, Y1 ...5.05

SHEETS, Cold-Rolled High-Strength Low-Alloy
Cleveland J5, R2 .....6.20
Ecorse,Mich. G5 .....6.40
Fontana,Calif. K1 .....7.05
Gary,Ind. C3 .....6.20
Ind.Harbor,Ind. I-2, Y1..6.20
Irvin,Pa. C3 .....6.20
Lackawanna(37) B2 ....6.20
Pittsburgh J5 .....6.20
Sharon,Pa. S3 .....6.20
SparrowsPoint(38) B2 ..6.20
Warren,O. R2 .....6.20
Weirton,W.Va. W6 ....6.20
Youngstown Y1 .....6.20

SHEETS, Cold-Rolled Steel (Commercial Quality)

Butler,Pa. A10	4.10
Cleveland J5, R2	4.10
Ecorse,Mich. G5	4.30
Fairfield,Ala. T2	4.10
Follansbee,W.Va. F4	4.10
Fontana,Calif. K1	5.00
Gary,Ind. C3	4.10
GraniteCity,Ill. G4	4.30
Ind.Harbor,Ind. I-2, Y1	4.10
Irvin,Pa. C3	4.10
Lackawanna,N.Y. B2	4.10
Middletown,O. A10	4.10
Pittsburg,Calif. C11	5.05
Pittsburgh J5	4.10
SparrowsPoint,Md. B2	4.10
Steubenville,O. W10	4.10
Warren,O. R2	4.10
Weirton,W.Va. W6	4.10
Youngstown Y1	4.10

SHEETS, Gal'zd No. 10 Steel

AlabamaCity,Ala. R2	4.40
Ashland,Ky.(8) A10	4.40
Canton,O. R2	4.40
Delphos,O. N16	5.15
Dover,O. R1	4.75
Fairfield,Ala. T2	4.40
Gary,Ind. C3	4.40
GraniteCity,Ill. G4	4.60
Ind.Harbor,Ind. I-2	4.40
Irvin,Pa. C3	4.40
Kokomo,Ind. C16	4.50
MartinsFerry,O. W10	4.40
Niles,O. N12	4.65
Pittsburg,Calif. C11	5.15
SparrowsPoint,Md. B2	4.40
Steubenville,O. W10	4.40
Torrance,Calif. C11	5.15
Weirton,W.Va. W6	4.40

SHEETS, Galvanized No. 10, High-Strength Low Alloy

Irvin,Pa. C3	6.75
SparrowsPoint(39) B2	6.75

SHEETS, Galvannealed Steel

Canton,O. R2	4.95
Irvin,Pa. C3	4.95
Kokomo,Ind. C16	5.05
Niles,O. N12	5.20

SHEETS, ZINCGRIP Steel No. 10

Butler,Pa. A10	4.65
Middletown,O. A10	4.65

SHEETS, Electro Galvanized

Cleveland R2 (28)	5.25
Niles,O. R2 (28)	5.25
Weirton,W.Va. W6	5.10

SHEETS, Zinc Alloy

Ind.Harbor,Ind. I-2	5.05

SHEETS, Long Terne, Steel (Commercial Quality)

BeechBottom,W.Va. W10	4.80
Gary,Ind. C3	4.80
Mansfield,O. E6	4.80
Middletown,O. A10	4.80
Niles,O. N12	4.80
Weirton,W.Va. W6	4.80

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10	5.20

ROOFING SHORT TERNES (Package; 8 lb coated)

Gary,Ind. C3	$17.50
Yorkville, O. W10	17.50

MANUFACTURING TERNES (Special Coated)

Fairfield,Ala. T2	$6.60
Gary,Ind. C3	6.50
Ind.Harbor I-2	6.50
Irvin,Pa. C3	6.50
Yorkville,O. W10	6.50

SHEETS, Lt. Coated Ternes, 6 lb

Yorkville, O. W10	$7.05

SHEETS, Mfg. Ternes, 8 lb

Gary,Ind. C3	$8.10
Warren,O. R2	8.10
Yorkville,O. W10	8.10

SHEETS, Coated Ternes, 12 lb

Yorkville, O. W10	8.95

SHEETS, Culvert, No. 16	Cu Alloy	Cu Fe
Ashland A10	5.20	...
Canton,O. R2	5.25	5.70
Fairfield,Ala. T2	5.20	5.45
Gary C3	5.20	5.45
IndianaHarbor I-2	5.20	5.45
Irvin,Pa. C3	5.20	5.45
Kokomo C16	5.40	...
MartinsFy,O. W10	5.20	5.45
Pittsburg,Cal. C11	5.95	...
SparrowsPt, B2	5.20	...
Torrance,Cal. C11	5.95	...

SHEETS, Culvert, No. 16 Corrugated Ingot Iron

Ashland,Ky. A10	5.45

SHEETS, Hot-Rolled Ingot Iron 18 Gage and Heavier

Ashland,Ky.(8) A10	3.60
Cleveland R2	3.95
Ind.Harbor,Ind. I-2	3.60
Warren,O. R2	3.95

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2	4.70
Middletown,O. A10	4.60
Warren,O. R2	4.70

SHEETS, Galvanized Ingot Iron No. 10 Flat

Ashland,Ky (8) A10	4.65
Canton,O. R2	5.15
Ind.Harbor,Ind. I-2	4.80

SHEETS, ZINCGRIP Ingot Iron

Butler,Pa. A10	4.90
Middletown,O. A10	4.90

SHEETS, Well Casing

Torrance,Calif. C11	4.85

SHEETS, Drum Body

Pittsburg,Calif. C11	4.05
Torrance,Calif. C11	4.05

SHEETS, Aluminized

Butler,Pa. A10	7.75

TIN PLATE, Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$6.35	$6.60	$6.85
Fairfield,Ala. T2	6.45	6.70	6.95
Gary,Ind. C3	6.35	6.60	6.85
GraniteCity,Ill. G4	6.55	6.80	7.05
Ind.Harbor,Ind. I-2, Y1	6.35	6.60	6.85
Irvin,Pa. C3	6.35	6.60	6.85
Niles,O. R2	6.35	6.60	6.85
Pittsburg,Calif. C11	7.10	7.35	7.60
SparrowsPoint,Md. B2	6.45	6.70	6.95
Weirton,W.Va. W6	6.35	6.60	6.85
Yorkville,O. W10	6.35	6.60	6.85

SHEETS, SILICON, H.R. or C.R. (22 Ga.) COILS (Cut Lengths ½c lower)	Field	Armature	Electric	Motor	Dynamo
BeechBottom W10 (cut lengths)	...	...	6.70	7.95	8.75
Brackenridge,Pa. A4	...	...	7.20	8.45	9.25
GraniteCity,Ill. G4(cut lengths)	...	...	6.90	8.15	...
Ind.Harbor,Ind. I-2	6.40	6.70	(34)	...	...
Mansfield,O. E6 (cut lengths)	5.90	6.20	6.70	7.95	8.75
Niles,O. N12 (cut lengths)	...	...	6.20	6.70	...
Niles,O. M4 (24 Gage)	5.65	5.95	6.45	...	...
Parkersburg F4 (cut lengths)	...	...	6.70	7.95	8.75
Vandergrift,Pa. C3	...	6.70	7.20	8.45	9.25
Warren,O. R2	6.40	6.70	7.20	8.45	9.25
Zanesville,O. A10	...	6.70	7.20	8.45	9.25

SHEETS, SILICON (22 Gage Base) Coils (Cut Lengths ½c lower)

Transformer Grade	72	65	58	52
BeechBottom W10 (cut lengths)	9.30	9.85	10.55	11.35
Brackenridge,Pa. A4	9.80	10.35	11.05	....
Parkersburg F4 (cut lengths)	9.30	....	....	....
Vandergrift,Pa. C3	9.80	10.35	11.05	11.85
Warren,O. R2	9.80	....	....	....
Zanesville,O. A10	9.80	10.35	11.05	11.85

H.R. or C.R. COILS AND CUT LENGTHS, SILICON (22 Ga.)	T-100	T-90	T-80	T-73
Vandergrift,Pa. C3	12.35	13.20	14.20	14.70

TIN PLATE, American COKE (Base Box)	1.25 lb	1.50 lb
Aliquippa J5	$7.30	$7.50
Fairfield,Ala. T2, 7.40	7.60	
Gary C3	7.30	7.50
Gran.City,Ill. G4, 7.50	7.70	
Ind.Harbor I-1, Y1	7.30	7.50
Irvin,Pa. C3	7.30	7.50
Pitts.Cal. C11	8.05	8.25
Sp.Pt.,Md. B2	7.40	7.60
Warren R2	7.30	7.50
Weirton W6	7.30	7.50
Yorkville,O. W10.	7.30	7.50

CANMAKING BLACK PLATE (Base Box)

Aliquippa,Pa. J5	$5.60
Fairfield,Ala. T2	5.70
Gary,Ind. C3	5.60
GraniteCity,Ill. G4	5.80
Ind.Harbor,Ind. I-2, Y1	5.60
Irvin,Pa. C3	5.60
Niles,O. R2	5.60
Pittsburg,Calif. C11	6.35
SparrowsPoint,Md. B2	5.70
Warren,O. R2	5.60
Weirton,W.Va. W6	5.60
Yorkville, O. W10	5.60

HOLLOWARE ENAMELING Black Plate (29 gage)

Aliquippa,Pa. J5	5.30
Follansbee,W.Va. F4	5.30
Gary,Ind. C3	5.30
GraniteCity,Ill. G4	5.50
Ind.Harbor,Ind. Y1	5.30
Irvin,Pa. C3	5.30
Niles,O. R2	5.30
SparrowsPoint,Md. B2	5.40
Warren,O. R2	5.30
Yorkville,O. W10	5.30

SHEETS, Enam'lg. Iron

Ashland,Ky.(8) A10	4.40
Cleveland R2	4.40
Ecorse,Mich. G5	4.70
Gary,Ind. C3	4.40
GraniteCity,Ill. G4	4.60
Ind.Harbor,Ind. I-2	4.40
Irvin,Pa. C3	4.40
Middletown,O. A10	4.40
Niles,O. M4	4.90
Youngstown Y1	4.40

STRIP, Hot-Rolled, High-Strength Low-Alloy

Bessemer,Ala. T2	4.95
Conshohocken,Pa. A3	4.95
Ecorse,Mich. G5	5.15
Fairfield,Ala. T2	4.95
Fontana,Cal. K1	6.64
Gary,Ind. C3	4.95
Ind.Harb.,Ind. I-2, Y1	4.95
Lackawanna,N.Y. B2	4.95
Sharon,Pa. S3	4.95
SparrowsPoint,Md. B2	4.95
Warren,O. R2	4.95
Weirton,W.Va. W6	4.95
Youngstown C3, Y1	4.95

STRIP, Hot-Rolled Alloy

Bridgeprt,Conn.(10)	S15.5.10
Carnegie,Pa. S18	5.10
Fontana,Calif. K1	6.30
Gary,Ind. C3	5.10
Houston,Tex. S5	5.50
KansasCity,Mo. S5	5.70
NewBritn.Conn.(10)	S15.5.10
Sharon, Pa.S3	5.10
Youngstown C3	5.10

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10	3.50
Warren,O. R2	3.85

STRIP, Hot-Rolled Carbon

Alton,Ill.(1) L1	3.25
Ashland,Ky.(8) A10	3.25
Atlanta A11	3.40
Bessemer,Ala. T2	3.25
Bridgeprt,Conn.(10)	S15.3.25
Butler,Pa. A10	3.25
Carnegie,Pa. S18	3.25
Conshohocken,Pa. A3	3.35
Detroit M1	3.45
Ecorse,Mich. G5	3.45
Fairfield,Ala. T2	3.25
Fontana,Calif. K1	4.40
Gary,Ind. C3	3.25
Houston,Tex. S5	3.65
Ind.Harbor,Ind. I-2, Y1	3.25
KansasCity,Mo.(9) S5	3.85
Lackawanna,N.Y. B2	3.25
LosAngeles B3	4.00
Milton,Pa. B6	3.25
Minnequa,Colo. C10	4.30
NewBritain(10) S15	3.25
N.Tonawanda,N.Y. B11	3.25
Pittsburg,Calif. C11	4.00
Riverdale,Ill. A1	3.25
SanFrancisco S7	3.90
Seattle B3, N14	4.25
Sharon,Pa. S3	3.25
So.Chicago,Ill. W14	3.25
So.SanFrancisco B3	4.00
SparrowsPoint,Md. B2	3.25
Torrance,Calif. C11	4.00
Warren,O. R2	3.25
Weirton,W.Va. W6	3.25
WestLeechburg,Pa. A4	3.25
Youngstown C3, Y1	3.25

STRIP, Cold-Rolled Alloy Steel

Bridgeprt,Conn.(10)	S15.9.50
Carnegie,Pa. S18	9.50
Cleveland A7	9.50
Dover,O. G6	9.50
Harrison,N.J. C18	9.80
NewBritn,Conn.(10)	S15.9.50
Pawtucket,R.I.(11) N8	9.50
Pawtucket,R.I.(12) N8	9.80
Sharon,Pa. S3	9.50
Worcester,Mass. A7	9.80
Youngstown C8	9.50

STRIP, Cold-Rolled Ingot Iron

Warren,O. R2	4.75

STRIP, Cold-Finished, Spring Steel (Annealed)	0.25-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Bridgeport,Conn.(10) S15	4.15	5.95	6.55	8.50	10.80
Bristol,Conn. W1	...	...	6.40	8.35	....
Carnegie,Pa. S18	...	5.95	6.55	8.50	10.80
Cleveland A7	4.15	5.95	6.55	8.50	10.80
Dover,O. G6	4.15	5.95	6.55	8.50	10.80
FranklinPark,Ill. T6	4.40	6.10	6.70	8.65	....
Harrison,N.J. C18	...	...	6.85	8.80	11.10
Mattapan,Mass. T6	4.65	6.25	6.85	8.80	11.10
NewBritn.,Conn.(10) S15	4.15	5.95	6.55	8.50	10.80
NewCastle,Pa. B4	4.15	5.95	6.55	8.50	....
NewCastle,Pa. E5	4.15	5.95	6.55	8.50	10.80
NewYork W3	...	6.30	6.90	8.85	11.15
Pawtucket, R. I. N8:					
Cleve.orPitts.Base (29)	4.70	5.95	6.55	8.50	10.80
Worcester,Base (29)	4.65	6.25	6.85	8.80	11.10
Sharon,Pa. S3	4.15	5.95	6.55	8.50	10.80
Trenton,N.J. R5	...	6.25	6.85	8.80	11.10
Wallingford,Conn. W2	4.65	6.25	6.85	8.80	11.10
Weirton,W.Va. W6	4.15	5.95	6.55	8.50	10.80
Worcester,Mass. A7	4.45	6.25	6.85	8.80	11.10
Worcester,Mass. T6	4.65	6.25	6.85	8.80	11.10
Youngstown C8	4.50	5.95	6.55	8.50	10.80
Spring Steel (Tempered)					
Trenton,N.J. R5	...	...	9.30	11.25	13.85
Harrison,N.J. C18	...	...	9.30	11.25	13.85

STRIP, Cold-Rolled Carbon

Anderson,Ind.(40) G6	4.15
Bered,O. C7	6.60
Bridgprt,Conn.(10)	S15.4.15
Butler,Pa. A10	4.15
Cleveland A7, J5	4.15
Dearborn,Mich. D3	4.40
Detroit, D2	4.40
Detroit M1	4.35
Dover,O.(40) G6	4.15
Ecorse,Mich. G5	4.35
Follansbee,W.Va. F4	4.15
Fontana,Calif. K1	5.40
FranklinPark,Ill. T6	4.30
Ind.Harbor,Ind. I-2	4.30
Lackawanna,N.Y. B2	4.15
LosAngeles C1	5.50
Mattapan,Mass.(21) T6	4.65
Middletown,O. A10	4.15
NewBritain(10) S15	4.15
NewCastle,Pa. B4, E5	4.15
NewHaven,Conn. A7, D2	4.65
NewYork W3	5.00
Pawtucket,R.I.(21) N8	4.65
Riverdale,Ill. A1	4.30
Rome,N.Y. R6	4.15
Sharon,Pa.(30) S3	4.15
SparrowsPoint,Md. B2	4.15
Trenton,N.J.(13) R5	4.65
Wallingford,Conn. W2	4.65
Warren,O.(25) T5	4.15
Warren,O. R2	4.15
Weirton,W.Va. W6	4.15
Youngstown C8, Y1	4.15

STRIP, Cold-Rolled, High-Strength Low-Alloy

Cleveland A7, J5	6.20
Dover,O. G6	6.20
Ecorse,Mich. G5	6.40
Fontana,Calif. K1	6.95
Lackawanna,N.Y., B2	6.40
Sharon,Pa. S3	6.20
SparrowsPoint,Md. B2	6.40
Warren,O. R2	6.20
Weirton,W. Va. W6	6.20
Youngstown Y1	6.20

STRIP, Electro Galvanized

Weirton,W.Va. W6	4.15
Youngstown C8	4.15

Key to Producing Companies

A1 Acme Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A7 American Steel & Wire
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.
A13 American Cladmetals Co.

B1 Babcock & Wilcox Tube
B2 Bethlehem Steel Co.
B3 Beth. Pac. Coast Steel
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B6 Bolardi Steel Corp.
B8 Braeburn Alloy Steel
B11 Buffalo Bolt Co.
B14 A. M. Byers Co.

C1 Calif. Cold Rolled Steel
C3 Carnegie-Illinois Steel
C4 Carpenter Steel Co.
C5 Central Iron & Steel Div. Barium Steel Corp.
C7 Cleve. Cld.Roll.Mills Co.
C8 Cold Metal Products Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia Steel Co.
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire

D2 Detroit Steel Corp.
D3 Detroit Tube & Steel
D4 Disston & Son, Henry
D6 Driver-Harris Co.
D7 Dickson Weatherproof Nail Co.

E1 Eastern Gas&Fuel Assoc.
E2 Eastern Stainless Steel
E4 Electro Metallurgical Co.
E5 Elliott Bros. Steel Co.
E6 Empire Steel Corp.

F2 Firth Sterling Steel
F3 Fitzsimons Steel Co.
F4 Follansbee Steel Corp.
F6 Fretz-Moon Tube Co.

G1 Geneva Steel Co.
G2 Globe Iron Co.
G3 Globe Steel Tubes Co.
G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.

H1 Hanna Furnace Corp.
H4 Heppenstall Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K5 Kidd Drawn Steel Co.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Electric Steel
L5 Lockhart Iron & Steel
L6 Lone Star Steel Co.
L7 Lukens Steel Co.

TIGHT COOPERAGE HOOP

Atlanta A11	3.60
Riverdale,Ill. A1	3.60
Sharon,Pa. S3	3.60
Youngstown C3	3.60

WIRE, MB Spring, High-Carbon

Aliquippa,Pa. J5	5.90
Alton,Ill.(1) L1	5.90
Bartonville,Ill.(1) K4	5.90
Buffalo W12	5.90
Cleveland A7	5.90
Donora,Pa. A7	5.90
Duluth A7	5.90
Fostoria,O. S1	5.90
Johnstown,Pa. B2	5.90
LosAngeles B3	6.85
Milbury,Mass(12) N6	6.20
Monessen,Pa. P7, P16	5.90
Palmer,Mass. W12	6.20
Pittsburg,Calif. C11	6.85
Portsmouth,O. P12	5.90
Roebling,N.J. R5	6.20
So.Chicago,Ill. R2	5.90
SparrowsPoint,Md. B2	6.00
Struthers,O. Y1	5.90
Trenton,N.J., A7	6.20
Waukegan,Ill. A7	5.90
Worcester A7,J4,T6,W12	6.20

WIRE, Cold-Rolled Flat

Anderson,Ind. G6	5.35
Buffalo W12	5.35
Cleveland A7	5.35
Crawfordsville,Ind. M8	5.35
Dover,O. G6	5.35
Fostoria,O. S1	5.50
Kokomo,Ind. C16	5.35
FranklinPark,Ill. T6	5.70
Massillon,O. R8	5.35
Monessen,Pa. P7, P16	5.35
Pawtucket,R.I.(12) N8	5.65
Trenton,N.J. R5	5.65
Worcester A7, T6, W12	5.65

WIRE, Fine and Weaving (8-in. Coils)

Bartonville,Ill.(1) K4	8.45
Buffalo W12	8.45
Chicago W13	8.45
Cleveland A7	8.45
Crawfordsville,Ind. M8	8.45
Fostoria,O. S1	8.45
Johnstown,Pa. B2	8.45
Kokomo,Ind. C16	8.45
Monessen,Pa. P16	8.45
Palmer,Mass. W12	8.75
Portsmouth,O. P12	8.45
Roebling,N.J. R5	8.75
Waukegan,Ill. A7	8.45
Worcester,Mass. A7, T6	8.75

WIRE, Manufacturers Bright, Low-Carbon

AlabamaCity,Ala. R2	4.50
Aliquippa,Pa. J5	4.50
Atlanta A11	4.60
Alton,Ill.(1) L1	4.50
Bartonville,Ill.(1) K4	4.50
Buffalo W12	4.50
Chicago W13	4.50
Cleveland A7, C20	4.50
Crawfordsville,Ind. M8	4.60
Donora,Pa. A7	4.50
Duluth A7	4.50
Fairfield,Ala. T2	4.50
Fostoria,O.(24) S1	4.85
Houston S5	4.90
Johnstown,Pa. B2	4.50
Joliet,Ill. A7	4.50
KansasCity,Mo. S5	5.10
Kokomo,Ind. C16	4.60
LosAngeles B3	5.45
Minnequa,Colo. C10	4.75
Monessen,Pa. P7	4.50
Newark,6-8ga. I-1	5.15
No.Tonawanda B11	4.90
Palmer,Mass. W12	4.80
Pittsburg,Calif. C11	5.45
Portsmouth,O. P12	4.50
Rankin,Pa. A7	4.50
So.Chicago,Ill. R2	4.50
So.SanFrancisco C10	5.45
SparrowsPoint,Md. B2	4.60
Sterling,Ill.(1) N15	4.50
Struthers,O. Y1	4.50
Torrance,Calif. C11	5.45
Waukegan,Ill. A7	4.50
Worcester,Mass. A7, T6	4.80

WIRE, Upholstery Spring

Aliquippa,Pa. J5	5.55
Alton,Ill.(1) L1	5.55
Buffalo W12	5.55
Cleveland A7	5.55
Donora,Pa. A7	5.55
Duluth A7	5.55
Johnstown,Pa. B2	5.55
LosAngeles B3	6.50
Monessen,Pa. P7, P16	5.55
NewHaven,Conn. A7	5.85
Palmer,Mass. W12	5.85
Pittsburg,Calif. C11	6.50
Portsmouth,O. P12	5.55
Roebling,N.J. R5	5.85
So.Chicago,Ill. R2	5.55
SparrowsPoint,Md. B2	5.65
Struthers,O. Y1	5.55
Torrance,Calif. C11	6.50
Trenton,N.J. A7	5.85
Waukegan,Ill. A7	5.55
Worcester,Mass. A7	5.85

ROPE WIRE	Mild Plow	Plow	Imp. Plow
Bartonville,Ill. K4	8.05	8.05	8.30
Buffalo W12	8.05	8.05	8.30
Cleveland A7	8.05	8.05	8.30
Donora,Pa. A7	8.05	8.05	8.30
Fostoria,O. S1	8.05	8.05	8.30
Johnstown,Pa. B2	8.05	8.05	8.30
Monessen,Pa. P7, P16	8.05	8.05	8.30
NewHaven,Conn. A7	8.35	8.35	8.60
Palmer,Mass. W12	8.05	8.05	8.30
Portsmouth,O. P12	8.05	8.05	8.30
Roebling,N.J. R5	8.35	8.35	8.60
SparrowsPoint,Md. B2	8.15	8.15	8.40
Struthers,O. Y1	8.05	8.05	8.30
Trenton,N.J. A7	8.35	8.35	8.60
Waukegan,Ill. A7	8.05	8.05	8.30
Williamsport,Pa. B2	8.15	8.15	8.40
Worcester,Mass. J4, T6	8.35	8.35	8.60

WIRE, Merchant Quality (6 to 8 gage)

	An'ld	Galv.
AlabamaCity R2	5.35	5.60
Aliquippa J5	5.35	5.60
Atlanta A11	5.45	5.70
Bartonville(19) K4	5.35	5.60
Buffalo(31) W12	4.50	...
Cleveland A7	5.35	5.60
Crawfordsvil, M8	5.45	5.70
Donora A7	5.35	5.60
Duluth A7	5.35	5.60
Fairfield T2	5.35	5.60
Houston,Tex. S5	5.75	6.00
Johnstown B2	5.35	5.60
Joliet,Ill. A7	5.35	5.60
KansasCy,Mo. S5	5.95	6.20
Kokomo C16	5.45	5.70
LosAngeles B3	6.30	...
Minnequa C10	5.60	5.85
Monessen P7	5.35	5.60
Palmer(31) W12	4.80	...
Pitts.,Cal. C11	6.30	6.55
Prtsmth.(18) P12	5.35	5.60
Rankin A7	5.35	5.60
So.Chicago R2	5.35	5.60
So.S.Fran. C10	6.30	6.55
SparrowsPt. B2	5.45	5.70
Sterling,Ill.(1)N15	5.35	5.60
Struthers,O. Y1	5.35	5.60
Torrance,Cal. C11	6.30	...
Worcester A7	5.65	5.90

WIRE (16 gage)	An'ld Stone	Galv. Stone
Aliquippa J5	9.80	11.30
Bartonville(1) K4	9.80	11.30
Cleveland A7	9.80	11.30
Crawfrdvil. M8	9.80	11.30
Fostoria,O. S1	9.90	11.40
Johnstown B2	9.80	11.30
Kokomo C16	9.80	11.30
Minnequa C10	9.40	10.90
Palmer,Mass. W12	9.35	10.85
Pitts.,Cal. C11	10.15	11.65
Prtsmth.(18) P12	9.80	11.30
SparrowsPt. B2	9.90	11.40
Waukegan A7	9.80	11.30

WIRE, Galv'd ACSR for Cores

Monessen,Pa. P16	8.15
Roebling,N.J. R5	8.45
SparrowsPoint,Md. B2	8.25

WIRE, Tire Bead

Monessen,Pa. P16	10.80
Roebling,N.J. R5	10.80

WIRE, Barbed

	Col.
AlabamaCity,Ala. R2	126
Aliquippa,Pa. J5	126
Atlanta A11	128
Crawfordsville M8	128
Donora,Pa. A7	126
Duluth,Minn. A7	126
Fairfield,Ala. T2	126
Houston,Tex. S5	134
Johnstown,Pa. B2	126
Joliet,Ill. A7	126
KansasCity,Mo. S5	138
Kokomo,Ind. C16	128
Minnequa,Colo. C10	131
Monessen,Pa. P7	126
Pittsburg,Calif. C11	146
Portsmouth,O.(18) P12	126
Rankin,Pa. A7	126
So.Chicago,Ill. R2	126
So.SanFran.,Calif. C10	146
SparrowsPoint,Md. B2	128
Sterling,Ill.(1) N15	126

FENCE POSTS

	Col.
Duluth A7	116
Huntington,W.Va. W7	116
Johnstown,Pa. B2	116
Joliet,Ill. A7	116
Minnequa,Colo. C10	121
Moline,Ill. R2	112
So.Chicago R2	116
Williamsport,Pa. S19	120

WOVEN FENCE, 9-15½Ga. Col.

AlabamaCity,Ala. R2	116
Ala.City,Ala.,17-18ga.R2	198
Aliquippa,Pa.9-14½ga.J5	116
Atlanta A11	118
Bartonville,Ill.(19) K4	116
Crawfordsville,Ind. M8	118
Donora,Pa. A7	116
Duluth A7	116
Houston,Tex. S5	124
Fairfield,Ala. T2	116
Johnstown,Pa. B2	116
Johnstn,17ga.6" B2	190
Johnstn,17ga.,4" B2	193
Joliet,Ill. A7	116
KansasCity,Mo. S5	128
Kokomo,Ind. C16	118
Minnequa,Colo. C10	121
Monessen,Pa. P7	116
Pittsburg,Calif. C11	139
Portsmouth,O.(18) P12	116
Rankin,Pa. A7	116
So.Chicago,Ill. R2	116

BALE TIES, Single Loop Col.

AlabamaCity,Ala. R2	113
Atlanta A11	114
Bartonville,Ill.(19) K4	113
Chicago W13	113
Crawfordsville M8	115
Donora,Pa. A7	113
Duluth A7	113
Fairfield,Ala. T2	113
Joliet,Ill. A7	113
KansasCity,Mo. S5	125
Kokomo,Ind. C16	115
Minnequa,Colo. C10	118
Pittsburg,Calif. C11	137
Portsmouth,O.(18) P12	113
So.Chicago,Ill. R2	113
So.SanFran.,Calif. C10	137
SparrowsPoint,Md. B2	115
Sterling,Ill.(1) N15	113

NAILS & STAPLES, Stock

To Dealers & Mfrs. (7)	Col.
AlabamaCity,Ala. R2	106
Aliquippa,Pa. J5	106
Atlanta A11	108
Bartonville,Ill.(19) K4	106
Chicago,Ill. W13	106
Cleveland A9	112
Crawfordsville,Ind. M8	108
Donora,Pa. A7	106
Duluth A7	106
Fairfield,Ala. T2	106
Galveston,Tex. D7	114
Houston,Tex. S5	114
Johnstown,Pa. B2	106
Joliet,Ill. A7	106
KansasCity,Mo. S5	118
Kokomo,Ind. C16	108
Minnequa,Colo. C10	111
Monessen,Pa. P7	106
Pittsburg,Calif. C11	125
Portsmouth,O. P12	106
Rankin,Pa. A7	106
So.Chicago,Ill. R2	106
SparrowsPoint,Md. B2	108

RAILS	Std. No. 1	Std. No. 2	Std. All No. 2	TeeRails 60 lb Under
Bessemer,Pa. C3	3.40	3.30	3.35	3.75
Ensley,Ala. T2	3.40	3.30	...	3.75
Fairfield,Ala. T2	...	...	...	3.75
Gary,Ind. C3	3.40	3.30	3.35	...
Huntington,W.Va. W7	...	...	...	3.75
Ind.Harbor,Ind. I-2	3.40	3.30	3.35	...
Johnstown,Pa. B2	...	...	...(16)	3.75
Lackawanna B2	3.40	3.30	...	3.75
Minnequa,Colo. C10	3.40	3.30	...	4.25
Steelton,Pa. B2	3.40	3.30	...	...

NAILS, Cut (100 lb keg) To dealers (33)

Conshohocken,Pa. A3	$6.75
Wheeling,W.Va. W10	6.75

AXLES

Fairfield,Ala. T2	5.25
Gary,Ind. C3	5.25
Ind.Harbor,Ind. S13	5.25
Johnstown,Pa. B2	5.25
McKeesRocks,Pa. C3	5.25

TIE PLATES

Fairfield,Ala. T2	4.20
Gary,Ind. C3	4.20
Ind.Harbor,Ind. I-2	4.20
Lackawanna,N.Y. B2	4.20
Minnequa,Colo. C10	4.20
Pittsburg,Calif. C11	4.35
Pittsburgh R2	4.20
Seattle B3	4.35
Steelton,Pa. B2	4.20
Torrance,Calif. C11	4.35
Weirton,W.Va. W6	4.20

JOINT BARS

Bessemer,Pa. C3	4.40
Fairfield,Ala. T2	4.40
Ind.Harbor,Ind. I-2	4.40
Joliet,Ill. C3	4.40
Lackawanna,N.Y. B2	4.40
Minnequa,Colo. C10	4.40
Steelton,Pa. B2	4.40

TRACK BOLTS (20) Treated

Fairfield,Ala. T2	9.10
KansasCity,Mo. S5	9.30
Lebanon,Pa.(32) B2	8.85
Minnequa,Colo. C10	9.05
Pittsburgh O3, P14	9.30
Seattle B3	9.05

STANDARD TRACK SPIKES

Fairfield,Ala. T2	5.60
Ind.Harbor,Ind. I-2, Y1	5.60
KansasCity,Mo. S5	5.85
Lebanon,Pa. B2	5.60
Minnequa,Colo. C10	5.60
Pittsburgh J5	5.60
Seattle B3	6.10
So.Chicago,Ill. R2	5.60
Struthers,O. Y1	5.60
Youngstown R2	5.60

Key to Producing Companies

M1	McLouth Steel Corp.
M4	Mahoning Valley Steel
M5	Medart Co.
M6	Mercer Tube & Mfg. Co.
M8	Mid-States Steel & Wire
M9	Midvale Co.
M10	Missouri-Illinois Furnace
M12	Moltrup Steel Products
M13	Monarch Steel Co.
M14	McInnes Steel Co.
N2	National Supply Co.
N3	National Tube Co.
N5	Nelsen Steel & Wire Co.
N6	New Eng.HighCarb.Wire
N8	Newman-Crosby Steel
N12	Niles Rolling Mill Co.
N14	Nrthwst. Steel Roll.Mill's
N15	Northwestern S.&W. Co.
N16	New Delphos Mfg. Co.
O3	Oliver Iron&Steel Corp.
O4	Oregon Steel Mills
P1	Pacific States Steel Corp.
P2	Pacific Tube Co.
P4	Phoenix Iron & Steel Co.
P5	Pilgrim Drawn Steel
P6	Pittsburgh Coke&Chem.
P7	Pittsburgh Steel Co.
P9	Pittsburgh Tube Co.
P11	Pollak Steel Co.
P12	Portsmouth Steel Div. Detroit Steel Corp.
P13	Precision Drawn Steel
P14	Pitts. Screw & Bolt Co.
P15	Pittsburgh Metallurgical
P16	Page Steel & Wire Div., Amer. Chain & Cable
P17	Plymouth Steel Co.
R1	Reeves Steel & Mfg. Co.
R2	Republic Steel Corp.
R3	Rhode Island Steel Corp.
R5	Roebling's Sons, John A.
R6	Rome Strip Steel Co.
R7	Rotary Electric Steel Co.
R8	Reliance Div.,EatonMfg.
S1	Seneca Wire & Mfg. Co.
S3	Sharon Steel Corp.
S5	Sheffield Steel Corp.
S6	Shenango Furnace Co.
S7	Simmons Co.
S8	Simonds Saw & Steel Co.
S9	Sloss-Sheffield S.&I. Co.
S13	Standard Forgings Corp.
S14	Standard Tube Co.
S15	Stanley Works
S16	Struthers Iron & Steel
S17	Superior Drawn Steel Co.
S18	Superior Steel Corp.
S19	Sweet's Steel Co.
T2	Tenn. Coal, Iron & R.R.
T3	Tenn. Prod. & Chem.
T4	Texas Steel Co.
T5	Thomas Steel Co.
T6	Thompson Wire Co.
T7	Timken Roller Bearing
T9	Tonawanda Iron Div. Am. Rad. & Stan. San.
U1	Ulster Iron Works
U4	Universal Cyclops Steel
V2	Vanadium Alloys Steel
V3	Vulcan Crucible Steel Co.
W1	Wallace Barnes Co.
W2	Wallingford Steel Co.
W3	Washburn Wire Co.
W4	Washington Steel Corp.
W6	Weirton Steel Co.
W7	W. Va. Steel & Mfg. Co.
W8	Wstrn.Auto.Mach.Screw
W9	Wheatland Tube Co.
W10	Wheeling Steel Corp.
W12	Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13	Wilson Steel & Wire Co.
W14	Wisconsin Steel Div., International Harvester
W15	Woodward Iron Co.
W16	Worth Steel Co.
W18	Wyckoff Steel Co.
Y1	Youngstwn Sheet & Tube

TOOL STEEL

Grade	Cents per lb	Grade	Cents per lb
Reg. Carbon	21.00	18W,4Cr,3V	126.00
Extra Carbon	24.50	18W,4Cr,2V,9Co	185.50
Spec. Carbon	29.50	18W,4Cr,2V,6Co	169.50
Oil Hardening	32.00	18.25W,4.25Cr,1V,4.75Co	156.50
Cr Hot Wrk.	32.00	20.25W,4.25Cr,1.6V,12.25Co	293.50
Hi-Carbon-Cr	57.50	1.5W,4Cr,1V,8.5Mo	71.50
18W,4Cr,1V	100.00	6.4W,4.5Cr,1.9V,5Mo.	76.50
18W,4Cr,2V	113.00	6W,4Cr,3V,6Mo	97.00

Tool steel producers include: A4, A8, B2, B8, C4, C9, C13, C18, D4, F2, H4, J3, L3, M9, M14, R2, S8, T7, U4, V2, V3.

(1) Chicago Base. (2) Angles.
(3) Merchant. (4) Reinforcing.
(5) Philadelphia del.
(6) Chicago or Birm. Base.
(7) To jobbers, 3 cols. lower.
(8) 16 gage and heavier.
(9) 6 in. and narrower.
(10) Pittsburgh Base.
(11) Cleveland & Pittsburgh Base.
(12) Worcester, Mass. Base.
(13) 3" & wider; over ½" to under 3" 5.15c.
(14) Also wide flange beams.
(15) ¼" and thinner.
(16) 40 lb and under.
(17) Flats only.
(18) To dealers.
(19) Chicago & Pittsburgh Base.
(20) Deduct 0.25c for untreated.
(21) New Haven, Conn. Base.
(22) Del. San Fran. Bay area.
(23) Angles 1"x1" to 1¼"x1¼" only.
(24) Deduct 0.35c for finer than 15 Ga.
(25) Up to 0.035 C; 4.40c, 0.035 C and over.
(26) Reinforcing, mill shipments; to consumers, 4.83c; fabricated to fabricators, 4.58c.
(28) Bonderized.
(29) 0.26-0.40 C.
(30) 0.40 C and less.
(31) Not annealed.
(32) Untreated.
(33) To jobbers, deduct 20 cents.
(34) 6.70c for cut lengths.
(35) 72" and narrower.
(36) 54" and narrower.
(37) 15 Ga. & lighter; 60" & narrower.
(38) 14 Ga. & lighter; 48" & narrower.
(39) 48" and narrower.
(40) Lighter than 0.035"; 4.40c, 0.035" and heavier.
(41) Flats.
(42) Bands.

STANDARD PIPE, T. & C.

BUTTWELD Size Inches	List Per Ft	Pounds Per Ft	Carload Discounts from List, % Black A	Black B	Black C	Galvanized D	Galvanized E	Galvanized F
⅛	5.5c	0.24	36.5	34.5	35.5	8.5	9.0	7.5
¼	6.0	0.42	33.5	31.5	32.5	9.5	11.0	8.5
⅜	6.0	0.57	29.0	27.0	28.0	5.5	8.0	4.5
½	8.5	0.85	40.5	38.5	39.5	24.0	22.0	23.0
¾	11.5	1.13	43.5	41.5	42.5	28.0	26.0	27.0
1	17.0	1.68	46.0	44.0	45.0	31.0	29.0	30.0
1¼	23.0	2.28	46.5	44.5	45.5	31.5	29.5	30.5
1½	27.5	2.73	47.0	45.0	46.0	32.0	30.0	31.0
2	37.0	3.68	47.5	45.5	46.5	32.5	30.5	31.5
2½	58.5	5.82	48.0	46.0	47.0	33.0	31.0	32.0
3	76.5	7.62	48.0	46.0	47.0	33.0	31.0	32.0

Column A: Etna, Pa. N2; Monaca, Pa. P9; Sharon, Pa. M6; Butler, Pa. ⅛-⅜", F6; Benwood, W. Va., 1½ percentage points lower on ⅛", 2 points lower on ¼", 3 points lower on ⅜", W10. Wheatland, Pa., 2 pts lower on ⅛" through ⅜", W9. Following make ½" and larger: Lorain, O. N3; Youngstown, plus 42% on 3½" and 4", R2; Youngstown Y1; Aliquippa, Pa. J5. Fontana, Calif. K1 quotes 11 points lower on ½" and larger continuous weld and 31% on 3½" and 4".

Columns B & E: Sparrows Point Md. B2.

Columns C & F: Indiana Harbor, Ind., ½" through 3", Y-1; Alton, Ill. (Lorain, O., base) L1 quotes 2 points lower on ⅛", ¼", ⅜".

Column D: Etna, Pa. N2; Monaca, Pa. P9; Sharon, Pa. M6; Butler, Pa., ⅛" through ⅜", F6; Benwood, W. Va., except 3½ points lower on ⅛", 2½ pts on ¼", 3 pts on ⅜", W10. Wheatland, Pa., except 2 pts lower on ⅛" through ⅜", W9. Following make ½" and larger: Lorain, N3; Youngstown, plus 26.5% on 3½" and 4", R2; Youngstown, Y1; Aliquippa, Pa. J5. Fontana, Calif. K1 quotes 11 points lower on ½" and larger continuous weld and 15.5% on 3½" and 4".

SEAMLESS AND ELECTRIC WELD Size Inches	List Per Ft	Pounds Per Ft	Carload Discounts from List, % Seamless Black A	Seamless Galv. B	Elec. Weld Black C	Elec. Weld Galv. D
2	37.0c	3.68	36.0	20.5	36.0	20.5
2½	58.5	5.82	39.0	23.5	39.0	23.5
3	76.5	7.62	39.0	23.5	39.0	23.5
3½	92.0	9.20	41.0	25.5	41.0	25.5
4	$1.09	10.89	41.0	25.5	41.0	25.5
5	1.48	14.81	41.0	25.5	41.0	25.5
6	1.92	19.18	41.0	25.5	41.0	25.5

Column A: Aliquippa J5; Ambridge N2; Lorain N3; Youngstown Y1.

Column B: Aliquippa J5; Lorain, O. N3; Youngstown Y1.

Columns C & D: Youngstown R2.

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut lengths 10 to 24 ft. inclusive.

O.D. In.	B.W. Ga.	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.	Elec. Weld C.D.
1	13	12.36	14.39	13.96	13.96
1¼	13	14.63	17.05	14.19	16.54
1½	13	16.17	19.02	15.68	18.45
1¾	13	18.39	21.64	17.84	20.99
2	13	20.61	24.24	19.99	23.51
2¼	13	22.96	27.03	22.27	26.22
2¼	12	25.29	29.76	24.53	28.87
2½	12	27.71	32.58	26.88	31.60
2¾	12	29.36	34.53	28.48	33.49
3	12	30.82	36.27	29.90	35.18
3¼	11	35.87	42.22	34.79	40.95
3½	11	38.52	45.35	37.36	43.99
4	10	47.82	56.25	46.39	54.56
4½	9	63.37	74.59	61.47	72.35
5	9	73.37	86.32	71.17	83.73
6	7	112.62	132.51	....	....

Boiler tube producers include Babcock & Wilcox Tube Co., National Tube Co., Globe Steel Tubes Co., Pittsburgh Steel Co., Republic Steel Corp., Standard Tube Co.

CLAD STEELS

(Cents per pound)

Cladding Stainless	Plates Carbon Base 10%	Plates Carbon Base 20%	Strip Cold-Rolled Carbon Base 10% Both sides	Sheets Carbon Base 10%	Sheets Carbon Base 20%	Sheets Copper Base Both Sides
302	....	....	....	19.75	21.50–22.50	75.00
304	22.50	26.50	....	20.75	22.50–24.00	77.00
305	....	....	....	....	....	79.00
309	27.00	31.00	....	....	....	....
310	32.50	36.50	....	....	....	105.00
316	27.00	31.00	....	26.00	28.00–32.00	....
317	30.50	34.50	....	....	....	....
318	29.50	33.50	....	....	....	....
321	23.50	27.50	....	23.00	25.00	90.00
347	25.00	29.00	....	24.00	26.00–30.00	94.00
405	18.75	24.75	....	....	....	....
410	18.25	24.25	....	....	....	....
430	18.25	24.25	....	....	....	....
Nickel	27.50	34.50	31.50	41.00	....	88.00
Inconel	36.00	46.00	....	....	....	115.00
Monel	29.00	37.00	26.50	33.50	....	83.00
Copper*	....	....	19.75†	23.75†	....	....

* Deoxodized. † Deduct 4.25c for hot-rolled. Production points for carbon base products; Stainless plates and sheets, Conshohocken, Pa. A3 and New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. W16 and Coatesville, Pa. L7; nickel, inconel and monel-clad plates, Coatesville L7; nickel, monel and copper-clad strip, Carnegie, Pa. S18. Production point for copper-base sheets is Carnegie A13.

BOLTS, NUTS

CARRIAGE, MACHINE BOLTS

(F.o.b. midwestern plants; per cent off list for less than case lots to consumers)

6 in. and shorter:

½-in. & smaller diam.	27
⅝-in. & ⅞-in.	29
1-in. and larger	26
Longer than 6 in.:	
All diams.	22
Lag bolts, all diams.:	
6 in. and shorter	30
over 6 in. long	28
Ribbed Necked Carriage	26
Blank	40
Plow	40
Step, Elevator, Tap, and Sleigh Shoe	28
Tire bolts	20
Boiler & Fitting-Up Bolts	37

NUTS

	Reg.	Heavy
H.P. & C.P. Reg. & Heavy Square:		
½-in. and smaller	25	
⅝-in. & ⅞-in.	23	
1-in.-1½-in.	23	
1⅝ in. and larger	16	
H.P. Hex.:		
½-in. & smaller	33	29
⅝-in. & ⅞-in.	28	25
1-in.-1½-in.	25	23
1⅝ in. & larger	17	16
C.P. Hex.:		
½-in. & smaller	33	29
⅝-in. & ⅞-in.	30	27
1-in. & 1½ in.	27	24
1⅝ in. & larger	20	17

SEMIFINISHED NUTS

American Standard

(Per cent off list for less than case or keg quantities)

	Hvy.	Reg.	Lght.
½-in. and smaller	35	41	41
⅝-in. & ⅞-in.	30	36	36
1-in.-1½ in.	27	31	33
1⅝-in. & larger	17	21	..

STEEL STOVE BOLTS

(F.o.b. plant; per cent off list in packages)

Plain finish	63.5 & 10
Plated finishes	50 & 10

HEXAGON CAP SCREWS

(1020 steel; packaged; per cent off list)

6 in. or shorter:	
¼-in. through ⅝-in.	50
¾-in. through 1 in.	43
Longer than 6 in.:	
¼-in. through ⅝-in.	33
¾-in. through 1 in.	13

SQUARE HEAD SET SCREWS

(Packaged; per cent off list)

1 in. diam x 6 in. and shorter	46
1 in. and smaller diam. x over 6 in.	33

HEADLESS SET SCREWS

(Packaged; per cent off list)

No. 10 and smaller	41
¼-in. diam. & larger	24
N.F. thread, all diams.	18

RIVETS

F.o.b. midwestern plants

Structural ½-in., larger 7.25c

⅞-in., under .....43 off

Washers, Wrought

F.o.b. shipping point, to jobbers .....Net to $1 off

ELECTRODES

(Threaded, with nipples, unboxed, f.o.b. plant)

GRAPHITE

Inches Diam.	Length	Cents per lb
17,18,20	60,72	16.00
8 to 16	48,60,72	16.50
7	48,60	17.75
6	48,60	19.00
4, 5⅛	40	19.50
3	40	20.50
2½	24,30	21.00
2	24,30	23.00
CARBON		
40	100,110	7.50
35	100,110	7.50
30	84,110	7.50
24	72 to 104	7.50
17 to 20	34,90	7.50
14	60,72	8.00
10,12	60	8.25

STAINLESS STEEL

(cents per pound)

Type	Sheets	C.R. Strip	Bars Wire Structurals
302	37.50	36.50	28.50
302	37.50	36.00	28.50
305	39.50	38.50	31.00
304	39.50	38.50	30.00
309	52.00	52.00	41.50
316	53.00	50.00	46.00
321	45.50	44.50	34.00
347	50.00	48.50	38.50
410	33.00	27.00	23.00
416	33.50	33.50	23.50
420	40.50	43.50	28.50
430	35.50	27.50	23.50
501	24.00	22.50	11.50
502	25.00	23.50	12.50

Baltimore, Type 301 through 347 sheet, except 309 E2.

Baltimore, bars, wire and structurals A10.

Brackenridge, Pa., sheets A4

Bridgeville, Pa., bars, wire, sheets & strip, except Type 309 strip quoted 51.00c U4.

Butler, Pa., sheets and str.p except Types 303, 309, 416, 420, 501 & 502 A10.

Carnegie, Pa., strip except Type 416; Type 309 strip quoted 51.00c S18.

Cleveland, strip, except Type 309 quoted 51.00c and except Type 416 A7.

Detroit, strip, except Type 309 M1.

Dunkirk, N.Y. bars, wire A4.

Duquesne, Pa., bars C3.

Fort Wayne, Ind., bars and and wire, except Types 501 and 502 J6.

Gary, Ind., sheets except Type 416 C3.

Harrison, N. J., strip C18.

Massillon, all products, except Type 309 bars, wire & structurals quoted 42.00c. Type 501, 10.50c, Type 502 11.50c R2.

McKeesport, Pa., bars; sheets except Type 416, C3.

McKeesport, Pa., bars & wire except Types 301, 309, 501 & 502; strip Types 410 & 430 only F2.

Middletown, O., sheets and strip, except Types 303, 416, 420, 501 and 502 A10.

Midland, sheets & strip C18.

Munhall, Pa., bars C3.

Pittsburgh, sheets C18.

Reading, Pa., bars & strip except Type 309 bars quoted 41.00c C4.

So. Chicago, Ind., bars & structurals C3.

Syracuse, N. Y., bars wire & structurals C18.

Titusville, Pa., bars U4.

Wallingford, Conn., strip, except 309, W2 quotes ¼-cent higher.

Washington, Pa., bars sheets & strip except Type 309 strip quoted 51.00c J3.

Washington, Pa., Types 301 through 347 sheets & strip as listed except 303 & 309; 316 sheets 58.00c, strip 60.00c W4.

Watervliet, N. Y., structurals & bars A4.

Waukegan, bars & wire A7.

West Leechburg, Pa., strip, except Type 300 quoted 51.00c A4.

Youngstown, strip C8.

COAL, CHEMICALS

Spot, cents per gallon, ovens

Pure benzol 22.00

Toluol, one deg. .19.00-24.75

Industrial xylol ..20.50-26.50

Per ton bulk, ovens

Sulphate of ammonia .$45.00

Cents per pound, ovens

Phenol, 40 (carlots, returnable drums) 13.50

Do., less than carlots..14.25

Do., tank cars 12.50

FLUORSPAR

Metallurgical grade, f.o.b. shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content, 70% or more, $37; less than 60%, $34.

Imported, net ton, duty paid, metallurgical grade, $39-$40.

METAL POWDERS

(Per pound, f.o.b. shipping point in ton lots for minus 100 mesh)

	Cents
Sponge Iron:	
98+% Fe, carlots	15.00
Swedish, c.l.f. New York, in bags	7.40-8.50
Electrolytic Iron:	
Annealed, 99.5% Fe	39.50
Unannealed, 99+% Fe	33.50
Unannealed, 99+% Fe (minus 325 mesh)	48.50
Carbonyl Iron:	
97.9-99.8%, size 5 to 10 microns	70.00-135.00
Aluminum:	
Carlots, freight allowed	27.00
Atomized, 500 lb drums, freight allowed	30.00
Brass, 10-ton lots	23.25-26.25
Copper:	
Electrolytic	27.75
Reduced	27.00
Lead	18.50
Manganese:	
Minus 100-mesh	52.00-55.00
Minus 35 mesh	48.00
Minus 200 mesh	56.00
Nickel, unannealed	61.00-66.00
Silicon	34.00-40.00
Solder (plus cost of metal)	8.50
Stainless Steel, 302	75.00
Tin	86.50
Zinc, 10-ton lots	15.25-18.00
	Dollars
Tungsten:	
99%, minus 80 to 200 mesh, freight allowed, over 1000 lb	2.90
1000 lb	2.95
less than 1000 lb	3.00
98.8%, minus 65 mesh, freight allowed. 1000 lb and over	2.90
less than 1000 lb	3.00
Molybdenum:	
99%, minus 80 to 200 mesh. over 500 lb	2.25
200 to 500 lb	2.60
less than 200 lb	2.75
82-88%, freight allowed, 2000 lb and over	2.40
less than 2000 lb	2.45
Chromium, electrolytic 99% Cr min.	3.50

METALLURGICAL COKE

Price per net ton

BEEHIVE OVENS

Connellsvil.fur.	$14.00-14.50
Connellsvil.fdry.	15.50-16.50
New River, foundry	19.00
Wise county, foundry	15.95
Wise county, furnace	15.20

OVEN FOUNDRY COKE

Kearney, N. J., ovens	$22.00
Everett, Mass., ovens	
New England, del.‡	23.40
Chicago, ovens	21.00
Chicago, del.	†22.45
Detroit, del.	24.91
Terre Haute, ovens	21.20
Milwaukee, ovens	21.75
Indianapolis, ovens	20.75
Chicago, del.	24.12
Cincinnati, del.	23.67
Detroit, del.	24.65
Ironton, O., ovens	20.40
Cincinnati, del.	22.71
Painesville, O., ovens	21.90
Buffalo, del.	24.02
Cleveland, del.	23.62
Erie, del.	22.04
Birmingham, ovens	19.15
Philadelphia, ovens	21.25
Neville Island, Pa., ovens	21.00
Swedeland, Pa., ovens	21.20
Portsmouth, O., ovens	*20.15*
Cincinnati, del.	*22.71*
Detroit, ovens	21.65
Detroit, del.	22.65
Buffalo, del.	24.00
Flint, del.	24.09
Pontiac, del.	23.04
Saginaw, del.	24.40

Includes representative switching charge of: *, $1.05; †, $1.45, one-track charge being $1.20, two tracks $1.40, and three or more tracks $1.50. ‡ Or within $4.15 freight zone from works.

WAREHOUSE STEEL PRODUCTS

(Prices, cents per pound, for delivery within switching limits, subject to extras)

	SHEETS			STRIP		BARS			Standard Structural Shapes	PLATES	
	H.R. 18 Ga., Heavier*	C.R.	Galv. 10 Ga.†	H.R.*	C.R.*	H.R. Rds.	C.F. Rds.	H.R. Alloy 4140§		Carbon	Floor
New York (city)	5.75	6.84	7.20	6.04	...	5.85	6.64	8.60	5.65	5.90	7.34
New York(c'try)	5.55	6.64	7.00	5.84	...	5.65	6.44	8.40	5.45	5.70	7.14
Boston (city) ..	5.93	6.68	7.19	5.98	...	5.80	6.50	8.70	5.75	6.08	7.28
Boston (c'try) .	5.73	6.48	6.99	5.78	...	5.60	6.30	8.50	5.55	5.88	7.08
Phila. (city) ..	6.45	6.60	6.95	5.90	...	5.75	6.46	8.40	5.50	5.70	6.80
Phila. (c'try)..	6.20	6.35	6.70	5.65	...	5.50	6.21	8.15	5.25	5.45	6.55
Balt. (city) ...	5.25	6.69	6.66	5.79	...	5.69	6.39	...	5.69	5.40	7.04
Balt. (c'try) ..	5.05	6.49	6.46	5.59	...	5.49	6.19	...	5.49	5.20	6.84
Norfolk, Va. ..	6.10	...	...	...	...	6.15	7.20	...	6.20	6.15	7.55
Wash. (w'hse).	5.46	...	...	6.00	...	5.90	6.62	...	5.90	5.61	7.25
Buffalo (del.)..	5.25	6.00	7.00	5.61	...	5.25	5.95	10.10††[5]	5.35	5.65	6.95
Buffalo (w'hse)	5.05	5.80	6.80	5.41	...	5.05	5.75	9.90††[5]	5.15	5.45	6.75
Pitts. (w'hse)..	5.05	5.80*	6.45-6.70	5.20	6.15	5.00	5.75	9.55††	5.05	5.15	6.40
Detroit (w'hse).	5.33	6.08*	7.09	5.49	...	5.39	6.03	9.86††[5]	5.44	5.59	6.68
Cleveland (del.)	5.25	6.00	7.15	5.44	6.35	5.32	5.95	8.31	5.37	5.52	6.72
Cleve. (w'hse).	5.05	5.80	6.95	5.24	6.15	5.12	5.75	8.16	5.17	5.32	6.52
Cincin. (w'hse).	5.32	5.84	6.44	5.49	...	5.39	6.10	9.90††[5]	5.44	5.59	6.75
Chicago (city) .	5.25	6.00*	6.90	5.30	...	5.20	5.85	9.75††[5]	5.25	5.40	6.60
Chicago (w'hse)	5.05	5.80*	6.70	5.10	...	5.00	5.65	9.55††[5]	5.05	5.20	6.40
Milwaukee(city)	5.39	6.14*	7.04	5.44	...	5.34	6.09	9.89††[5]	5.39	5.54	6.74
Milwau. (c'try).	5.19	5.94*	6.84	5.24	...	5.14	5.89	9.69††[5]	5.19	5.34	6.54
St. Louis (del.).	5.78	6.28	7.18	5.58	...	5.48	6.28	10.03††[5]	5.53	5.68	6.88
St. L. (w'hse).	5.58	6.13	7.03	5.43	...	5.33	6.08	9.88††[5]	5.38	5.53	6.73
Birm'ham (del.)	5.20[10]	5.95	6.30[2]	5.25[10]	...	5.15[10]	6.88	...	5.20[10]	5.35[10]	7.63[10]
Birm'hm(w'hse)	5.05[10]	5.80	6.15[2]	5.10[10]	...	5.00[10]	...	...	5.05[10]	5.20[10]	...
Omaha, Nebr. .	6.13‡	...	8.33	6.13	...	6.18	6.98	...	6.18	6.38	7.83
Los Ang. (city)	6.00	7.20	7.65	6.05	8.30	6.00	7.75	...	5.90	6.00	8.20
L. A. (w'hse)..	5.80	7.00	7.45	5.85	8.10	5.80	7.55	...	5.70	5.80	8.00
San Francisco .	6.25[9]	8.60[2]	7.50[2]	6.75[9]	8.25[3]	6.15[9]	7.80[8]	...	6.00[9]	6.15[9]	8.10[9]
Seattle-Tacoma.	6.60	8.15[3]	...	6.85	...	6.35	8.50	10.10	6.20	6.35[7]	8.40[7]
Kans. (w'hse).	5.65	6.40	7.30	5.70	...	5.60	6.35	10.10	5.65	5.80	7.00

* Prices do not include gage extras; † prices include gage and coating extras, except Birmingham (coating extra excluded) and Los Angeles (gage extra excluded); ‡ includes extra for 10 gage; § as rolled; †† as annealed. Base quantities, 2000 to 9999 lb except as noted: Cold-rolled strip, 2000 lb and over; cold-finished bars, 2000 lb and over; [2]—500 to 1499 lb; [3]—450 to 1499 lb; [5]—1000 to 1999 lb; [7]—300 to 999 lb; [8]—300 to 499 lb; [9]—400 to 9999 lb; [10]—500 to 9999 lb inclusive.

REFRACTORIES

(Prices per 1000 bricks, f.o.b. plant)

FIRE CLAY BRICK

Super Duty: St. Louis, Vandalia, Farber, Mexico, Mo., Olive Hill, Ky., Clearfield, or Curwensville, Pa., Ottawa, Ill., $106. Hard-fired, $142 at above points.

High-Heat Duty: Salina, Pa. $91; Woodbridge N. J., St. Louis, Farber, Vandalia, Mexico, Mo., West Decatur, Orviston, Clearfield, Beach Creek, or Curwensville, Pa., Olive Hill, Hitchins, Haldeman, or Ashland, Ky., Troup, or Athens, Tex., Stevens Pottery, Ga., Portsmouth, or Oak Hill, O., Ottawa, Ill., $86.

Intermediate-Heat Duty: St. Louis, or Vandalia, Mo., West Decatur, Orviston, Beach Creek, or Clearfield, Pa., Olive Hill, Hitchins, or Haldeman, Ky., Athens, or Troup, Tex., Stevens Pottery, Ga., Portsmouth, O., Ottawa, Ill., $80.

Low-Heat Duty: Oak Hill, or Portsmouth, O., Clearfield, Orviston, Pa., Bessemer, Ala., $72; Ottawa, Ill., $70.

LADLE BRICK

Dry Press: Freeport, Merill Station, Clearfield, Pa., Irondale, Wellsville, O., Chester, W. Va., New Cumberland, W. Va., $60.

Wire Cut: Chester, W. Va., Wellsville, O., New Cumberland, W. Va., $58.

MALLEABLE BUNG BRICK

St. Louis, Mo., Olive Hill, Ky., $96; Ottawa, Ill., $90; Beach Creek, Pa., $86.

SILICA BRICK

Mt. Union, Claysburg, or Sproul, Pa., Portsmouth, O., Ensley, Ala., $86; Hays, Pa., $91; Joliet or Rockdale, Ill., E. Chicago, Ind., $95; Lehi, Utah, Los Angeles, $101.

Eastern Silica Coke Oven Shapes (net ton): Claysburg, Mt. Union, Sproul, Pa., Birmingham, $84.

Illinois Silica Coke Oven Shapes (net ton): Joliet or Rockdale, Ill., E. Chicago, Ind., Hays, Pa., $85.

BASIC BRICK

(Base prices per net ton; f.o.b. works, Baltimore or Chester, Pa.)

Burned chrome brick, $66; chemical-bonded chrome brick, $69; magnesite brick, $91; chemical-bonded magnesite, $80.

MAGNESITE

(Base prices per net ton, f.o.b. works, Chewelah, Wash.)

Domestic dead-burned, ¾" grains; bulk, $33; single paper bags, $38.

DOLOMITE

(Base prices per net ton)

Domestic, dead-burned bulk; Billmeyer, Blue Bell, Williams, Plymouth Meeting, Pa., Millville, W. Va., Nario, Millersville, Martin, Gibsonburg, Woodville, O., $12.25; Thornton, McCook, Ill., $12.35; Dolly Siding, Bonne Terre, Mo., $12.45.

ORES

LAKE SUPERIOR IRON ORE

Gross ton, 15½% (natural), lower lake ports. After Jan. 25, 1950, increases or decreases, if any, in upper lake rail freight, dock handling charges and taxes thereon are for buyer's account.

Old range bessemer	$8.10
Old range nonbessemer	7.95
Mesabi bessemer	7.85
Mesabi nonbessemer	7.70
High phosphorus	7.70

EASTERN LOCAL ORE

Cents per unit, del E. Pa.

Foundry and basic 56.62% concentrates contract	16.00

FOREIGN ORE

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 60 to 68%:	
Spot	17.00
Long-term contract	15.00
North African hematites	15.75
Brazilian iron ore, 68-69%	18.00

TUNGSTEN ORE

Wolframite, scheelite, net ton unit, duty paid	$20-22

MANGANESE ORE

Long term contracts, nominal; nearby, 48%, duty paid, 79.8c-81.8c per long ton unit, c.i.f. U. S. ports; prices on lower grades adjusted to manganese content and impurities.

CHROME ORE

Gross ton, f.o.b. cars, New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., or Tacoma, Wash.

Indian and African

48% 2.8:1	$32.50
48% 3:1	35.00-36.00
48% no ratio	26.00

South African Transvaal

44% no ratio	$17.00-18.00
45% no ratio	17.30-18.30
48% no ratio	26.00
50% no ratio	27.00-27.50

Brazilian

44% 2.5:1 lump	$32.00

Rhodesian

45% no ratio	$20.00-21.00
48% no ratio	26.00
48% 3:1 lump	35.00-36.00

Domestic—rail nearest seller

48% 3:1	$39.00

MOLYBDENUM

Sulphide concentrates per lb, molybdenum content, mines	$0.90

FERROALLOYS

MANGANESE ALLOYS

Spiegeleisen: (19-21% Mn, 1-3% Si), Carlot per gross ton, $65, Palmerton, Pa.; $66, Pittsburgh and Chicago; (16% to 19% Mn) $1 per ton lower.

Standard Ferromanganese: (Mn 78-82%, C 7% approx.) Carload, lump, bulk $172 per gross ton of alloy, cl., packed, $184; gross ton lots, packed, $199; less gross ton lots, packed, $216; f.o.b. Alloy, W. Va., Niagara Falls, N. Y., or Welland, Ont. Base price: $174, f.o.b. Birmingham and Johnstown, Pa., furnaces; $172, Sheridan, Pa.; $175, Etna, Pa. Shipment from Pacific Coast warehouses by one seller add $33 to above prices, f.o.b. Los Angeles, San Francisco, Portland, Oreg. Shipment from Chicago warehouse, ton lots, $214; less gross ton lots, $231 f.o.b. Chicago. Add or subtract $2.15 for each 1% or fraction thereof, of contained manganese over 82% and under 78%, respectively.

Low-Carbon Ferromanganese, Regular Grade: (Mn 80-85%). Carload, lump, bulk, max. 0.10% C, 24.75c per lb of contained Mn, carload packed 25.5c, ton lot 26.6c, less ton 27.8c. Delivered. Deduct 0.5c for max. 0.15% C grade from above prices, 1c for max. 0.30% C, 1.5c for max. 0.50% C, and 4.5c for max. 75% C—max. 7% Si. **Special Grade:** (Mn 90% approx., C 0.07% max., P. 0.06% max.). Add 0.5c to above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.5% max., Si 1.5% max.). Carload, lump, bulk 18.15c per lb of contained Mn, carload packed 18.9c, ton lot 20.0c, less ton 21.2c. Delivered. Spot, add 0.25c.

Manganese Metal, 2" x D (Mn 96% min., Fe 2% max., Si 1% max., C 0.2% max.): Carload lump bulk, 29c per lb of metal; packed, 35.5c; ton lot 31.25c, less ton lot 33.25c. Delivered. Spot, add 2c.

Manganese Electrolytic: Less than 250 lb, 35c; 250 lb to 1999 lb, 32c; 2000 to 35,999 lb, 30c; 36,000 lb or more, 28c. Premium for hydrogen-removed metal 1.5c per pound, f.o.b. cars Knoxville, Tenn. Freight allowed to St. Louis or to any point east of Mississippi.

Silicomanganese: (Mn 65-68%). Contract, lump, bulk, 1.50% C grade, 18-20% Si, 8.95c per lb of alloy, carload packed, 9.70c, ton lot 10.60c, less ton 11.60c. Freight allowed. For 2% C grade, Si 15-17%, deduct 0.2c from above prices. Spot, add 0.25c.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: Contract, c.l., lump, bulk, 20.5c per lb of contained Cr, c.l., packed 21.4c, ton lot 22.55c, less ton 23.95c. Delivered: Spot, add 0.25c.

"SM" High-Carbon Ferrochrome: (Cr 60-65%, Si 4-6%, Mn 4-6%, C 4-6%). Add 1.1c to high-carbon ferrochrome prices.

(*Please turn to page* 140)

Copper and Zinc Prices Advance

Producers raise copper to 19.50c and zinc to 11.00c as consumers compete actively for limited supplies. Tin eases following climb to 77.50-cent level

New York — Nonferrous metal prices moved into higher ground last week as active demand continued for limited supplies.

Electrolytic copper advanced 1 cent a pound to 19.50c, delivered Connecticut Valley, effective Apr. 18. This is the first change recorded since Nov. 3, 1949, when the market rose to 18.50c from 17.62½c a pound. The price of slab zinc advanced ½-cent a pound to 11.00c, East St. Louis, effective Apr. 19. Zinc has advanced 1.25 cents a pound since Mar. 14 when the price moved up to 10.00c a pound from 9.75c. It has recovered 2.50 cents a pound from the 1949 low.

Straits tin prices rose to 77.50c on Apr. 17, equalling the high for the year to date. Trading on subsequent days was done at fractionally lower levels.

Lead Price Tone Strong

New York—Firmer undertone developed in lead, but prices held unchanged on the basis of 10.30c, East St. Louis, for the common grade. Sellers report their daily intake is readily absorbed. Total sales of lead for delivery this month exceed those for March and are the largest since January.

The present market is below the expected long-range price level. R. L. Wilcox, chief, Nonferrous Metal Branch, Economic Cooperation Administration, says it is difficult to see how the long-range market could be sustained much below 11.00c to 15.00c per pound in view of the none too encouraging outlook for increased mine production and the seemingly ever-increasing cost of recovery from existing or indicated reserves.

"The current United States lead position emphasizes the need for increased domestic mine production to maintain smelter operations at the present level and minimize dependence upon imports of ores and concentrates," he added.

Officials in the lead industry are optimistic with regard to results of research for the future of the lead industry. New processes have been discovered for the refining of primary metal, new alloys have been developed which give improved service over those formerly available in certain applications, and indications are that white lead should be able to hold its own in its competition with titanium dioxide pigments.

Use of lead in manufacture of batteries continues the most important outlet for the metal. The amount of lead in automotive vehicle service is expected to increase to 536,400 tons in 1950 from 505,300 tons in 1949. Tonnage of lead in industrial battery application, including isolated plant, motive power, railway carlighting, diesel locomotive, submarine, telephone, etc., totals about 200,000 tons.

E. W. Green, purchasing agent, Electric Storage Battery Co., Philadelphia, estimates total lead requirements for storage batteries at 350,000 tons including: Replacement batteries, 250,800 tons; new batteries, 62,700; export batteries, 4500 tons; industrial batteries, 32,000 tons.

The rapid growth of the use of batteries in tractor service is noteworthy and compares closely with the increase in consumption of lead in the tetraethyl field. Use rose from about 3000 tons in 1940 to about 34,000 tons in 1949.

Although manufacturers of replacement batteries are operating at reduced schedules, shipments continue to exceed 1 million units a month. Shipments increased to 1,188,000 in March from 1,174,000 in February and compare with only 560,000 units in March, 1949. First quarter shipments totaled 3,829,000 units this year compared with 2,629,000 in 1949. Manufacturers are expected to start stepping up operating schedules around the middle of the year in preparation for the 1950-51 season.

The vinyl plastics industry, a new lead consuming industry, is expected to take several thousand tons of the metal annually. Lead compounds, functioning as stabilizers, have been found to impart varying types of beneficial results to the life and durability of vinyl plastics.

Tin Supplies Tighten

New York—Supplies of Grade A tin, particularly Straits, are limited for prompt delivery. The market here is extremely sensitive to price movements in Singapore and London.

Price movement is erratic with sales recorded around 77.00c. Some RFC metal is moving on a price average basis.

Total receipts of primary tin by the Reconstruction Finance Corp. increased to 4119 tons in March from 2842 in February and 2737 tons in January. Of the March total, 2729 tons were smelter output and 1390 tons were imports. Allocations during the month amounted to 2915 tons compared with only 200 in February and 100 in January, indicating that consumers drew on RFC reserves when they were unable to obtain necessary tonnages through normal trade channels. With stocks at the end of March totaling 23,396 tons compared with 25,816 at the end of February, it is estimated that about 3600 tons were transferred to the government's strategic stockpile. This reserve now contains about 95,000 tons of tin.

Copper Demand Remains Heavy

New York—Advance in the price of copper is the culmination of market developments which have been evident since early in the year. Supplies have tightened steadily by sustained heavy demand from the automotive and building industries and improved demand from utilities. There is no indication of any immediate slackening in any of these fields.

The tight supply was accentuated by a recent strike at Anaconda Copper Mining Co.'s large mine in Chile, causing a loss of some 12,000 tons of copper, and a brief suspension of the company's copper casting furnaces at Raritan, N. J., because of labor difficulties.

No material lessening of the supply tension is expected before July when brass and wire mills close their plants for the annual two-week vacation periods. These mills have revised their prices upward in line with the advances in copper and zinc quotations. Brass ingot, scrap and other copper-allied product prices are also established at higher levels.

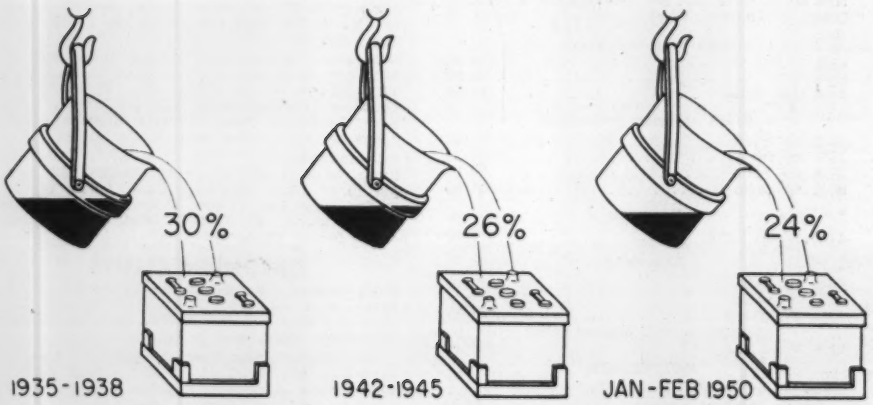
Canada Wire Export Sales Drop

Toronto — Canada Wire & Cable Co. has lost foreign business as result of British Ministry of Supply discontinuing purchase of copper rods from Canada, says J. Y. Murdock, president. The company's domestic business has remained satisfactory.

Chief Consumer of Lead

. . . is still the battery industry

(Percentages are of total shipments)



NONFERROUS METALS

(Cents per pound, carlots, except as otherwise noted)

Primary Metals

Copper: Electrolytic 19.50c, Conn. Valley; Lake, 19.62½c, Conn. Valley.

Brass Ingot: 85-5-5-5 (No. 115) 17.25-18.25c; 88-10-2 (No. 215) 25.25c; 80-10-10 (No. 305) 21.75c; No. 1 yellow (No. 405) 14.75-16.00c.

Zinc: Prime western 11.00c; brass special 11.25c, intermediate 11.50c, East St. Louis; high grade 12.10c delivered.

Lead: Common, 10.30c; chemical, 10.40c; corroding, 10.40c, St. Louis.

Primary Aluminum: 99% plus, ingots 17.00c, pigs 16.00c. Base prices for 10,000 lb and over, f.o.b. shipping point.

Secondary Aluminum: Piston alloys 16.00-16.50c; No. 12 foundry alloy (No. 2 grade) 15.50-16.00c; steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 17.25-17.75c; grade 2, 16.75-17.25c; grade 3, 15.25-15.75c; grade 4, 14.75-15.00c. Prices include freight at carload rate up to 75 cents per 100 lb.

Magnesium: Commercially pure (99.8%) standard ingots, 10,000 lb and over, 20.50c, f.o.b. Freeport, Tex.

Tin: Grade A, prompt del., 77.00c; May del. 76.00c; June del. 75.50c; July del. 75.25c.

Antimony: American 99-99.8% and over but not meeting specifications below 24.50c; 99.8% and over (arsenic 0.05% max.; other impurities 0.1% max.) 25.00c; f.o.b. Laredo, Tex., for bulk shipments. Foreign, 99%: Chinese, English, Belgian, prompt, 23.00c, New York.

Nickel: Electrolytic cathodes, 99.9%, base sizes at refinery, unpacked, 40.00c; 25-lb pigs, 42.50c; "XX" nickel shot, 43.50c; "F" nickel shot or ingots, for addition to cast iron, 40.50c. Prices include import duty.

Mercury: Open market, spot, New York $71-$74 per 76-lb flask.

Beryllium-Copper: 3.75-4.25% Be, $24.50 per lb contained Be.

Cadmium: "Regular" straight or flat forms, $2 del.; special or patented shapes, $2.15.

Cobalt: 97-99%, $1.80 per lb for 550 lb (keg); $1.80 per lb for 100 lb (case); $1.87 per lb under 100 lb.

Gold: U. S. Treasury, $35 per ounce.

Silver: Open market, New York, 71.75c per oz.

Platinum: $66-$69 per ounce.

Palladium: $24 per troy ounce.

Iridium: $100 per troy ounce.

Titanium (sponge form): $5 per pound.

Rolled, Drawn, Extruded Products

COPPER AND BRASS

(Base prices, cents per pound, f.o.b. mill; based on 19.50-cent copper.)

Sheet: Copper 33.18; yellow brass 29.50; commercial bronze, 95% 33.08; 90% 32.58; red brass, 85% 31.56; 80% 31.07; best quality 30.51; nickel silver, 18% 43.04; phosphor-bronze, grade A, 5% 50.90.

Rods: Copper, hot-rolled 29.03; cold-drawn 30.28; yellow brass free cutting, 23.99; commercial bronze, 95% 32.77; 90% 32.27; red brass 85% 31.25; 80% 30.76.

Seamless Tubing: Copper 33.22; yellow brass 32.62; commercial bronze 90% 35.24; red brass 85% 34.47; 80% 33.98.

Wire: Yellow brass 29.90; commercial bronze, 95% 33.37; 90% 32.87; red brass, 85% 31.85; 80% 31.36; best quality brass 30.80.

Copper Wire: Bare soft, f.o.b., eastern mills, 100,000 lb lots 23.55c, l.c.l. 24.17, c.l. 23.67; weatherproof, f.o.b. eastern mills, 100,000 lb lots 25.60, l.c.l. 26.35, c.l. 25.85; magnet, delivered, c.l. 29.50, 15,000 lb or more 29.75, l.c.l. 30.00.

ALUMINUM

Sheets and Circles: 2S and 3S mill finish c.l.

Thickness Range, Inches	Widths or Diameters, In., Incl.	Flat Sheet Base*	Coiled Sheet Base	Coiled Sheet Circle† Base
0.249-0.136	12-48	26.9	...	...
0.135-0.096	12-48	27.4	...	...
0.095-0.077	12-48	27.9	26.0	29.6
0.076-0.068	12-48	28.5	26.2	29.8
0.067-0.061	12-48	28.5	26.2	29.8
0.060-0.048	12-48	28.7	26.4	30.1
0.047-0.038	12-48	29.1	26.6	30.4
0.037-0.030	12-48	29.5	27.0	30.9
0.029-0.024	12-48	29.9	27.3	31.3
0.023-0.019	12-36	30.5	27.7	31.8
0.018-0.017	12-36	31.1	28.3	32.6
0.016-0.015	12-36	31.8	28.9	33.5
0.014	12-24	32.7	29.7	34.6
0.013-0.012	12-24	33.6	30.4	35.5
0.011	12-24	34.6	31.3	36.7
0.010-0.0095	12-24	35.6	32.3	38.0
0.009-0.0085	12-24	36.8	33.4	39.5
0.008-0.0075	12-24	38.1	34.6	41.1
0.007	12-18	39.5	35.9	42.9
0.006	12-18	41.0	37.2	47.0

* Minimum length, 60 inches. † Maximum diameter, 24 inches.

Screw Machine Stock: 5000 lb and over.

Diam. (in.) or distance across flats	—Round— R317-T4, 17S-T4	R317-T4	—Hexagonal— 17S-T4
0.125	48.0	...	...
0.156-0.203	41.0	...	...
0.219-0.313	38.0	...	...
0.344	37.0	...	47.0
0.375	36.5	45.5	44.0
0.406	36.5	...	...
0.438	36.5	45.5	44.0
0.469	36.5	...	...
0.500	36.5	45.5	44.0
0.531	36.5	...	...
0.563	36.5	...	41.5
0.594	36.5	...	...
0.625	36.5	43.0	41.5
0.656	36.5	...	...
0.688	36.5	...	41.5
0.750-1.000	35.5	40.5	39.0
1.063	35.5	...	37.5
1.125-1.500	34.5	39.0	37.5
1.563	34.5	..	36.5
1.625	33.5	...	36.5
1.688-2.000	33.5	...	...
2.125-2.500	33.5	...	...
2.625-3.375	31.5	...	...

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh) Sheets: Full rolls, 140 sq ft or more, $15.50 per cwt; add 50c per cwt, 10 sq ft to 140 sq ft. Pipe: Full coils, $15.50 per cwt. Traps and bends: List price plus 37%.

ZINC

Sheets, 16.00c f.o.b. mill, 36,000 lb and over. Ribbon zinc in coils, 15.50c, f.o.b. mill, 36,000 lb and over. Plates, not over 12-in., 14.50c; over 12-in., 15.50c.

NICKEL

(Base prices f.o.b. mill)

Sheets, cold-rolled, 60.00c. Strip, cold-rolled, 66.00c. Rods and shapes, 56.00c. Plates 58.00c. Seamless tubes, 89.00c.

MONEL

(Base prices, f.o.b. mill)

Sheets, cold-rolled 47.00c; Strip, cold-rolled, 50.00c. Rods and shapes, 45.00c. Plates, 46.00c. Seamless tubes, 80.00c. Shot and blocks, 40.00c.

MAGNESIUM

Extruded Rounds, 12 in. long, 1.312 in. in diameter, less than 25 lb, 52.00-56.00c; 25 to 99 lb, 42.00-46.00c; 100 lb to 4000 lb, 35.00-36.00c.

Plating Materials

Chromic Acid: 99.9% flake, f.o.b. Philadelphia, carloads, 25.50c; 5 tons and over 26.00c; 1 to 5 tons, 26.50c; less than 1 ton, 27.00c.

Copper Anodes: Base 2000 to 5000 lb; f.o.b. shipping point, freight allowed; Flat untrimmed 28.84c; oval 28.34c; cast 26.87c.

Copper Cyanide: 70-71% Cu, 100-lb drums, 46.50c f.o.b. Niagara Falls, N. Y.

Sodium Cyanide: 96-98%, ½-oz ball, in 200 lb drums, 1 to 900 lb, 18.00c; 1000 to 19,000 lb, 17.00c, f.o.b. Niagara Falls, N. Y. Packaged in 100 lb drums add ½-cent.

Copper Carbonate: 54-56% metallic Cu; 50 lb bags, up to 250 lb, 25.75c; over 250 lb, 24.75c, f.o.b. Cleveland.

Nickel Anodes: Rolled oval, carbonized, carloads, 56.00c; 10,000 to 30,000 lb, 57.00c; 3000 to 10,000 lb, 58.00c; 500 to 3000 lb, 59.00c; 100 to 500 lb, 61.00c; under 100 lb, 64.00c; f.o.b. Cleveland.

Nickel Chloride: 100-lb kegs, 26.50c; 400-lb bbl. 24.50c, f.o.b. Cleveland, freight allowed on barrels, or 4 or more kegs.

Tin Anodes: Bar, 1000 lb and over 91.00c; 500 to 999 lb, 91.5c; 200 to 499 lb, 92.00c; less than 200 lb, 93.5c; ball, 1000 lb and over, 93.25c; 500 to 999 lb, 93.75c; 200 to 499 lb 94.25c; less than 200 lb, 95.75c f.o.b. Sewaren, N. J.

Sodium Stannate: 25 lb cans only, less than 100 lb, to consumers 58.2c; 100 or 300 lb drums only, 100 to 500 lb, 49.9c; 600 to 1900 lb, 47.6c; 2000 to 9900 lb, 45.8c, f.o.b. Sewaren, N. J. Freight not exceeding St. Louis rate allowed.

Zinc Cyanide: 100-lb drums 38.00c, f.o.b. Niagara Falls, N. Y.; 40.50c f.o.b. Cleveland; 39.25c, del., Detroit and Philadelphia.

Stannous Sulphate: 100 lb kegs or 400 lb bbl, less than 2000 lb 84.50c; more than 2000 lb, 82.50c, f.o.b. Carteret, N. J.

Stannous Chloride (Anhydrous): In 400 lb bbl, 70.80c; 100 lb kegs 71.80c, f.o.b. Carteret, N. J.

Scrap Metals

BRASS MILL ALLOWANCES

Prices in cents per pound for less than 15,000 lb, f.o.b. shipping point.

	Clean Heavy	Rod Ends	Clean Turnings
Copper	16.50	16.50	15.75
Yellow Brass	13.37½	13.12½	12.25
Commercial Bronze			
95%	15.50	15.25	14.75
90%	15.25	15.00	14.50
Red brass			
85%	15.00	14.75	14.25
80%	14.62½	14.37½	13.87½
Best Quality (71-80%)	14.25	14.00	13.50
Muntz Metal	12.37½	12.12½	11.62½

BRASS INGOT MAKERS' BUYING PRICES

(Cents per pound, delivered eastern refineries, carload lots)

No. 1 copper 15.50; No. 2 copper 14.50; light copper 13.50; composition red brass 13.00; radiators 10.25; heavy yellow brass 9.75.

REFINERS' BUYING PRICES

(Cents per pound, delivered refinery, carload lots)

No. 1 copper 15.50; No. 2 copper 14.50; light copper 13.50; refinery brass (60% copper) per dry copper content 14.00.

DEALERS' BUYING PRICES

(Cents per pound, New York, in ton lots)

Copper and brass: Heavy copper and wire, No. 1 13.75-14.00; No. 2 12.75-13.00 light copper 11.75-12.00; No. 1 composition red brass 11.25-11.50; No. 1 composition turnings 10.50-10.75; mixed brass turnings 6.50-6.75; new brass clippings 10.50-11.00; No. 1 brass rod turnings 9.25-9.50; light brass 6.25-6.50; heavy yellow brass 7.50-7.75; new brass rod ends 9.75-10.00; auto radiators, unsweated 8.75-9.00; cocks and faucets, 8.75-9.00; brass pipe 9.25-9.50.

Lead: Heavy 8.00-8.25; battery plates 4.00-4.25; linotype and stereotype 8.75-9.00; electrotype 8.25-8.50; mixed babbitt 8.00-8.25.

Zinc: Old zinc 5.00-5.25; new die cast scrap 5.00-5.25; old die cast scrap 3.50-3.75.

Tin: No. 1 pewter 39.00-41.00; block tin pipe 60.00-62.00; No. 1 babbitt 30.00-32.00.

Aluminum: Clippings 2S 10.00-10.50; old sheets 7.00-7.50; crankcase 7.00-7.50; borings and turnings 4.00.

DAILY PRICE RECORD

1950	Copper	Lead	Zinc	Tin	Aluminum	Antimony	Nickel	Silver
Apr. 19-20	19.50	10.30	11.00	77.00	17.00	24.50	40.00	71.75
Apr. 18	19.50	10.30	10.50	76.75	17.00	24.50	40.00	71.75
Apr. 17	18.50	10.30	10.50	77.50	17.00	24.50	40.00	71.75
Apr. 14-15	18.50	10.30	10.50	76.75	17.00	24.50	40.00	71.75
Apr. 12-13	18.50	10.30	10.50	76.50	17.00	24.50	40.00	71.75
Apr. 11	18.50	10.30	10.50	76.25	17.00	24.50	40.00	71.75
Apr. 6-10	18.50	10.30	10.50	76.00	17.00	24.50	40.00	71.75
Apr. 5	18.50	10.30	10.50	75.375	17.00	24.50	40.00	71.75
Apr. 3-4	18.50	10.30	10.50	74.75	17.00	24.50	40.00	71.75
Apr. 1	18.50	10.30	10.25	74.75	17.00	24.50	40.00	71.75
Mar. Avg.	18.50	10.763	9.444	75.745	17.000	24.60	40.00	73.120
Mar. 31	18.50	10.30	10.25	74.75	17.00	24.50	40.00	71.75
Mar. 30	18.50	10.30	10.25	75.25	17.00	24.50	40.00	71.75

NOTE: Copper: Electrolytic, del. Conn. Valley; Lead, common grade, del. E. St. Louis; Zinc, prime western, del. St. Louis; Tin, Straits, del. New York; Aluminum primary ingots, 99%, del.; Antimony, bulk, f.o.b. Laredo, Tex.; Nickel, electrolytic cathodes, 99.9%, base sizes at refinery unpacked; Silver, open market, New York. Prices, cents per pound; except silver, cents per ounce.

IRON AND STEEL SCRAP

Consumer prices, except as otherwise noted, including brokers' commissions, as reported to STEEL, Apr. 20, 1950; gross tons except as noted. Changes shown in italics.

STEELMAKING SCRAP COMPOSITE

Apr. 20	$29.50
Apr. 13	29.08
Mar. 1950	28.23
Apr. 1949	24.06
Apr. 1945	19.17

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania.

PITTSBURGH

No. 1 Heavy Melt.	*$33.00*
No. 2 Heavy Melt.	*29.00-30.00**
No. 1 Busheling	*33.00*
No. 1 Bundles	*33.00*
No. 2 Bundles	*26.50-27.50*
No. 3 Bundles	*25.00-26.00**
Heavy Turnings	*30.50-31.50*
Machine Shop Turnings	*24.00-24.50†*
Mixed Borings, Turnings	*24.00-24.50†*
Short Shovel Turnings	*27.00-28.00*
Cast Iron Borings	25.00-26.00
Low Phos. Steel	*36.00-37.00*

Cast Iron Grades

No. 1 Cupola Cast	*35.00-36.00*
No. 1 Machinery Cast	*39.00-40.00*
Charging Box Cast	*36.00-37.00*
Heavy Breakable Cast	*32.50-33.50*

Railroad Scrap

No. 1 R.R. Heavy Melt.	34.50-35.00
Axles	36.50-37.00
Rails, Random Lengths	37.00-38.00
Rails, 2 ft. and under	*39.50-40.50*
Rails, 18 in. and under	*40.50-41.50*
Railroad Specialties	37.00-37.50
Angles, Splice Bars	*39.00-40.00**

* Nominal.
† Crushers' buying prices.

CLEVELAND

No. 1 Heavy Melt. Steel	*$30.00-30.50*
No. 2 Heavy Melt. Steel	*28.00-28.50*
No. 1 Busheling	*30.00-30.50*
No. 1 Bundles	*30.00-30.50*
No. 2 Bundles	*24.50-25.00*
Machine Shop Turnings	*20.50-21.00*
Mixed Borings, Turnings	*23.50-24.00*
Short Shovel Turnings	*23.50-24.00*
Cast Iron Borings	*23.50-24.00*
Low Phos.	*31.00-31.50*

Cast Iron Grades

No. 1 Cupola	*44.00-44.50*
Charging Box Cast	*38.50-39.50*
Stove Plate	*36.00-37.00*
Heavy Breakable Cast	*33.00-33.50*
Unstripped Motor Blocks	*31.50-32.50*
Brake Shoes	*29.50-30.50*
Clean Auto Cast	*44.50-45.50*
No. 1 Wheels	*37.50-38.00*
Burnt Cast	*33.50-34.00*

Railroad Scrap

No. 1 R.R. Heavy Melt.	*33.50-34.00*
R.R. Malleable	*39.50-40.00*
Rails, 3 ft and under	*42.00-43.00*
Rails, 18 in. and under	*44.00-45.00*
Rails, Random Lengths	*39.00-40.00*
Cast Steel	*35.00-36.00*
Railroad Specialties	*36.00-36.50*
Uncut Tires	*37.00-38.00*
Angles, Splice Bars	*41.50-42.00*

VALLEY

No. 1 Heavy Melt. Steel	*$33.50-34.00*
No. 2 Heavy Melt. Steel	*31.00-32.00*
No. 1 Bundles	*33.50-34.00*
No. 2 Bundles	*26.50-27.50*
Machine Shop Turnings	*23.00-24.00*
Short Shovel Turnings	*25.50-26.00*
Cast Iron Borings	*25.50-26.00*
Low Phos.	*34.50-35.00*

Railroad Scrap

No. 1 R.R. Heavy Melt.	*34.50-35.00*

PHILADELPHIA

No. 1 Heavy Melt. Steel	$26.00
No. 2 Heavy Melt. Steel	24.00
No. 1 Busheling	25.00
No. 1 Bundles	26.00
No. 2 Bundles	20.50
Machine Shop Turnings	18.00
Short Shovel Turnings	20.50-21.00
Mixed Borings, Turnings	17.00
Low Phos. Punchings and Plate, elec. fur. grade	*30.00-31.00*
Low Phos. Plate, 5 ft & Under	*29.00-30.00*
Elec. Furnace Bundles	*27.00*
Heavy Turnings	27.00-28.00
No. 1 Chemical Borings	30.00
Knuckles and couplers	*32.00-34.00*
Steel car wheels	*32.00-34.00*

Cast Iron Grades

No. 1 Cupola Cast	*34.00-35.00*
No. 1 Machinery Cast	*38.00-39.00*
No. 1 Yard Cast	*34.00*
Charging Box Cast	36.00
Heavy Breakable Cast	36.00
Unstripped Motor Blocks	*29.00*
Clean Auto Cast	38.00
No. 1 Wheels	40.00
Malleable	39.00-40.00

CINCINNATI

No. 1 Heavy Melt. Steel	*$29.50*
No. 2 Heavy Melt. Steel	*24.00*
No. 1 Busheling	*29.50*
No. 1 Bundles	*29.50*
No. 2 Black Bundles	*24.50*
No. 3 Bundles	*19.00*
Machine Shop Turnings	15.00
Short Shovel Turnings	18.00
Mixed Borings, Turnings	17.00
Cast Iron Borings	18.00

Cast Iron Grades

No. 1 Cupola Cast	*42.00*
Charging Box Cast	36.00
Stove Plate	*29.50*
Heavy Breakable Cast	*35.00*
Unstripped Motor Blocks	*26.00*
Brake Shoes	*24.00*
Clean Auto Cast	*42.00*
Drop Broken Cast	*44.00*

Railroad Scrap

No. 1 R.R. Heavy Melt.	*32.00*
R.R. Malleable	*35.00*
Rails, Rerolling	*40.00*
Rails, Random Lengths	*37.50*
Rails, 18 in. and under	*45.00*

DETROIT

(Brokers' buying prices, f.o.b. shipping point)

No. 2 Heavy Melt. Steel	$23.00-23.50
No. 1 Bundles	*28.50-29.00*
No. 2 Bundles	20.00-21.00
No. 1 Busheling	*27.50-28.00*
Machine Shop Turnings	16.50-17.00
Mixed Borings, Turnings	16.50-17.00
Short Shovel Turnings	*19.50-20.00*
Cast Iron Borings	*19.50-20.00*
Punchings & Plate Scrap	*28.50-29.00*

Cast Iron Grades

No. 1 Cupola Cast	*35.00-36.00*
Heavy Breakable Cast	*30.50-31.50*
Clean Auto Cast	*40.00-41.00*

BUFFALO

No. 1 Heavy Melt. Steel	$29.50-30.00
No. 2 Heavy Melt. Steel	27.50-28.00
No. 1 Bushelings	27.50-28.00
No. 1 Bundles	28.50-29.00
No. 2 Bundles	26.00-26.50
Machine Shop Turnings	18.00-18.50
Mixed Borings, Turnings	19.00-19.50
Cast Iron Borings	19.00-19.50
Short Shovelings	19.50-20.00
Low Phos.	30.50-31.00

Cast Iron Grades

No. 1 Machinery	37.00-38.00
No. 1 Cupola	*33.00-34.00*
Stove Plate	31.50-32.50
Malleable	32.50-33.00

Railroad Scrap

Rails, 2 ft. and under	38.00-39.00
Scrap rails	35.00-35.50
Specialties	33.00-34.00

NEW YORK

(Brokers' buying prices f.o.b. shipping point)

No. 1 Heavy Melt. Steel	*$23.00-24.00*
No. 2 Heavy Melt. Steel	*19.00-19.50*
No. 1 Busheling	*20.00-21.00*
No. 1 Bundles	*23.00-24.00*
No. 2 Bundles	*17.50-18.00*
Machine Shop Turnings	*13.50-14.00*
Mixed Borings, Turnings	*13.50-14.00*
Short Shovel Turnings	14.00-14.50
Punchings & Plate Scrap	*25.00-26.00*
Low Phos. Plate, 5 ft & under	*25.00-26.00*
Elec. Furnace Bundles	*23.00-24.00*

Cast Iron Grades

No. 1 Cupola Cast	*27.50-28.00*
No. 1 Machinery	*29.00-30.00*
Charging Box Cast	*28.50-29.50*
Heavy Breakable	*28.50-29.50*
Unstripped Motor Blocks	*21.50-22.00*
Malleable	35.00

BOSTON

(F.o.b. shipping point)

No. 1 Heavy Melt. Steel	*$21.50-22.50*
No. 2 Heavy Melt. Steel	*18.00-18.50*
No. 1 Bundles	21.00-21.50
No. 1 Busheling	20.00-20.50
Machine Shop Turnings	12.50-13.00
Mixed Borings, Turnings	12.50-13.00
Short Shovel Turnings	14.00-14.50
Bar Crops and Plate	21.00-22.00
Punchings & Plate Scrap	21.00-22.00
Chemical Borings	19.00-19.50

Cast Iron Grades

No. 1 Cupola Cast	27.50-30.50
Mixed Cast	*23.50-24.00*
Heavy Breakable Cast	24.50-25.50
Stove Plate	21.50-22.50
Unstripped Motor Blocks	17.50-18.50

CHICAGO

No. 1 Heavy Melt. Steel	*$29.00-30.00*
No. 2 Heavy Melt. Steel	*27.00-28.00*
No. 1 Bundles	*29.00-30.00*
No. 2 Bundles	25.00
Machine Shop Turnings	19.00-20.00
Mixed Borings, Turnings	20.50-21.00
Short Shovel Turnings	*22.00*
Cast Iron Borings	20.00-21.00
Low Phos.	32.00-33.00
Elec. Furnace Bundles	29.00-30.00
Heavy Turnings	*24.00-25.00*
Cut Structurals	*30.00-31.00*

Cast Iron Grades

No. 1 Cupola Cast	*42.00-43.00*
Clean Auto Cast	*43.00-44.00*
No. 1 Wheels	*37.00-38.00*
Stove Plate	32.50-33.50

Railroad Scrap

No. 1 R.R. Heavy Melt.	*32.00-33.00*
Malleable	42.00-43.00
Rails, Rerolling	46.00-47.00
Rails, Random Lengths	36.00-37.00
Rails, 2 ft and under	41.00-42.00
Rails, 18 in. and under	42.00-43.00
Railroad Specialties	33.00-34.00
Angles, Splice Bars	38.00-39.00

BIRMINGHAM

No. 1 Heavy Melt. Steel	$24.00
No. 2 Heavy Melt. Steel	22.00
No. 1 Busheling	22.00
No. 2 Bundles	20.00
Machine Shop Turnings	19.50
Mixed Borings, Turnings	17.00
Short Shovel Turnings	23.00
Cast Iron Borings	19.00
Bar Crops and Plate	27.00-28.00
Cut Structurals	27.00-28.00

Cast Iron Grades

No. 1 Cupola Cast	35.00
Stove Plate	30.00
No. 1 Wheels	30.50-31.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	25.00-26.00
R.R. Malleable	nominal
Rails, Rerolling	33.00-35.00
Rails, 3 ft and under	nominal
Angles and Splice Bars	nominal

ST. LOUIS

No. 1 Heavy Melt. Steel	$30.00-31.00
No. 2 Heavy Melt. Steel	24.50-25.50
Machine Shop Turnings	*16.00-17.00*
Short Shovel Turnings	18.00-19.00

Cast Iron Grades

No. 1 Cupola Cast	37.00-39.00
Charging Box Cast	32.00-33.00
Heavy Breakable Cast	31.00-32.00
Brake Shoes	31.00-32.00
Clean Auto Cast	36.00-38.00
Burnt Cast	*30.00-31.00*

Railroad Scrap

R.R. Malleable	*34.00-35.00*
Rails, Rerolling	*44.00-46.00*
Rails, Random Lengths	*34.00-36.00*
Rails, 3 ft and under	*39.00-40.00*
Uncut Tires	*30.00-31.00*
Angles, Splice Bars	*36.00-37.00*
Railroad Specialties	*32.00-33.00*

SAN FRANCISCO

No. 1 Heavy Melt. Steel	$20.00
No. 2 Heavy Melt. Steel	18.00
Nos. 1 & 2 Bundles	16.00
No. 3 Bundles	13.00
Machine Shop Turnings	9.00

Cast Iron Grades

No. 1 Cupola Cast	30.00-35.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	20.00
Rails, Random Lengths	20.00

SEATTLE

No. 1 Heavy Melt. Steel	$18.00
No. 2 Heavy Melt. Steel	18.00
No. 1 Busheling	15.50
Nos. 1 & 2 Bundles	16.00
No. 3 Bundles	nom.
Machine Shop Turnings	13.00
Mixed Borings, Turnings	13.00
Punchings & Plate Scrap	27.50
Cut Structurals	27.50

Cast Iron Grades

No. 1 Cupola Cast	25.00-30.00
Heavy Breakable Cast	25.00
Stove Plate	25.00
Unstripped Motor Blocks	18.00
Malleable	25.00
Brake Shoes	20.00
Clean Auto Cast	27.50
No. 1 Wheels	27.50

Railroad Scrap

No. 1 R.R. Heavy Melt.	19.00
Railroad Malleable	25.00
Rails, Random Lengths	19.00
Angles and Splice Bars	19.00

LOS ANGELES

(F.o.b. car, Los Angeles)

No. 1 Heavy Melt. Steel	$20.00
No. 2 Heavy Melt. Steel	18.00
Nos. 1 & 2 Bundles	16.00
No. 3 Bundles	nom.
Machine Shop Turnings	5.00
Mixed Borings, Turnings	5.00
Punchings & Plate Scrap	26.00

Cast Iron Grades

No. 1 Cupola Cast	34.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	20.00
Rails, Rerolling	30.00

HAMILTON, ONT.

(Delivered prices)

Heavy Melt.	$24.00
No. 1 Bundles	24.00
Mechanical Bundles	22.00
Mixed Steel Scrap	20.00
Mixed Borings, Turnings	18.00
Rails, Remelting	24.00
Rails, Rerolling	27.00
Busheling	18.50
Bushelings new factory, prep'd	22.00
Bushelings new factory, unprep'd	17.00
Short Steel Turnings	18.00

Cast Iron Grades

Cast	40.00-43.00*

* F.o.b, shipping point.

Sheets Strip . . .

Sheet and Strip Prices, Page 121 & 122

New York—Some sheet sellers have entered specifications for July. These entries are small because arrearages are so substantial little capacity is available for new business that month. Some sellers haven't any capacity available for July and claim they will be fortunate if they can add a month's rolling of new business to third quarter production. Any important cutbacks between now and summer, such as might result from a major strike in the automotive industry, would change the outlook.

One of the severest bottlenecks is in electrical sheets. This has resulted from withdrawal of two producers from the silicon sheet market. Manufacturers of small motors apparently are in dire straits. Producers are being forced to allocate this tonnage rigidly.

Pittsburgh — Further evidence of continued heavy demand for strip is decision of Weirton Steel Co. to expend $840,000 for electrical equipment to double the speed of its 36-in. 4-stand cold reduction mill to maximum of 3000 fpm on light gage stock.

Despite shortage of enameling sheets, first-quarter production schedules at Westinghouse Electric Corp.'s Mansfield, O., plant were maintained at record levels. General Electric Co.'s orders for refrigerators, ranges, washing machines, etc., still exceed the company's capacity to produce.

Pressure for prompt sheet and strip delivery is unabated. Some consumers are making commitments for conversion tonnage. In many instances production schedules are retarded due to lack of steel. There is no evidence of slackening in mill rolling schedules through July.

Boston—More difficulty is experienced in placing third quarter orders. Mills are well booked in that period. In addition to hot and cold-rolled carbon sheets, electrical grades are booked into third quarter. Demand for hot-rolled sheets and strip is marked by heavy specifications for hot-topped steel. Hot strip schedules for July are filled. Stainless buying is active. New promising market for stainless is television equipment.

Philadelphia—Pressure for sheets is mainly for hot and cold-rolled and galvanized. But a severe bottleneck is being experienced in electrical sheets. Stainless strip supply also is tighter.

Cleveland—Supply conditions in the light, flat-rolled products are getting tighter. Producers' order books are loaded into third quarter and they have not yet opened books for that period. Carryover from second quarter will tax producing capacity through July at least. Buyers of light-gage hot-rolled sheets are meeting increasing difficulty in obtaining supplies. The reason for this is only a few mills are producing tonnage in the 19 gage and lighter classification and they are booked to the hilt. Production of the lighter gages on the large continuous mills is said to be more costly than heavier gages. Silicon sheets,

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Perma-Drum separating brass from iron chips as they leave the dryer at large midwestern plant.

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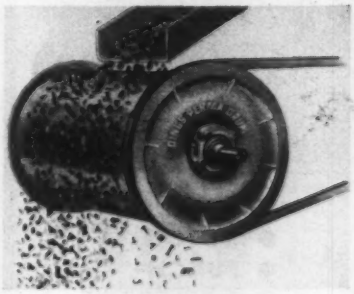
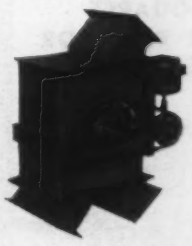


Non-magnetic material flows over revolving drum shell in normal trajectory. Magnetic materials are held fast to shell until carried beyond the magnetic field, at which point they are separately discharged.



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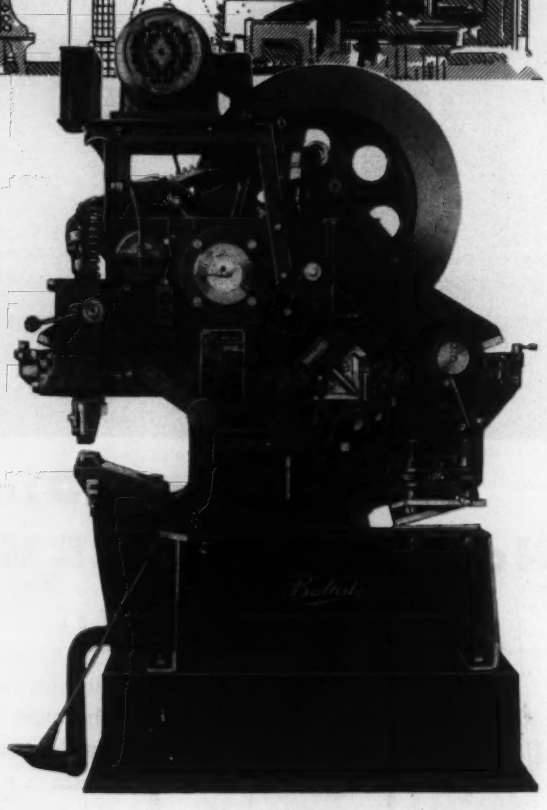

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in relatively limited production, also are increasingly scarce. One maker is said to be booked through remainder of the year.

Chicago — Precedent-shattering district steel production falls short of meeting consumer needs. Third-quarter quotas will reflect the huge carryover, amounting in some cases to a full month's output. Consumers are increasingly critical of the tonnage going to automotive companies; mills report conversion is the primary reason for the higher precentage of total shipments which auto makers receive. Farm implement makers' interest in conversion tonnage is on the wane; appliance makers are accounting for less than previously.

Cincinnati—Sheet inquiries indicate capacity output will be absorbed in the third quarter.

Birmingham — Pressure continues for light, flat-rolled products. Orders are heavy for three months ahead and would be larger except for producers' cautious selling policy.

St. Louis—Inquiries for sheet conversion capacity are picking up briskly, a large portion coming from automaking centers. Sheetmakers generally have no space for new conversion business on their schedules. Sheet demand remains heavy from refrigerator, stove and electrical manufacturers. Calls for galvanized roofing are unabating. Flat steel production for this district appears to have set a first quarter record. Granite City Steel Co., shipped 10 per cent more than in the corresponding 1949 quarter.

Los Angeles—Increasing activity of fabricators of small buildings is helping sustain requirements for light-gage galvanized sheet. Mills are steadily whittling away at their backlogs and in some instances are delivering light-gage galvanized sheet six weeks ahead of promised dates.

San Francisco—Demand for sheets continues strong. Supplies have not increased, resulting in mounting pressure from fabricators and jobbers. Lack of shipments from the East has widened the gap between supply and demand.

Tin Plate . . .

Tin Plate Prices, Page 122

Pittsburgh—Capacity tin plate production schedules are indicated through third quarter. Mills only last week began to accept specifications for July delivery. Heavy pressure continues for prompt delivery, but most customers' stocks are ample. Trend toward broader use of electrolytic plate is backed by proposed expansion at Carnegie's Gary Works of an additional line rated at 120,000 tons annually. A new electrolytic line recently started up at Weirton, rated at 5 million base boxes, while Wheeling has an additional line under construction and Bethlehem has announced an expansion program at Sparrows Point including tin plate capacity.

Chicago—Annual tin plate capacity of the Gary sheet and tin mill will be upped 120,000 tons by Car-

negie-Illinois Steel Corp. this year. A fourth electrolytic line and a continuous annealing furnace will be installed. To supply the line, South Works will increase capacity of its 44-in. slab mill by 150,000 tons a year. Improvements at Gary are in addition to a continuous galvanizing line, soon to be put into operation. Increase in tin plate capacity follows closely reports from major can makers of expansions in the Chicago and Milwaukee areas, and also of development of new applications for cans. The latest is an expendable cartridge-can of fuel for a new-type blow torch, and possible future use in lanterns, camp cook stoves, etc.

Structural Shapes . . .

Structural Shape Prices, Page 121

Boston—New tonnage pending includes 4500 tons, public works, mostly bridges. The largest is contract 2, Olneyville cutoff, Providence, R. I., 3000 tons. Most general contract bridge bids are frequently under engineering estimates. An exception is the Moon-Long-Island bridge, Boston Harbor, which takes around 3300 tons. Plain standard material is available in three to four weeks. Competition among fabricators is keen.

New York—Apart from public work, notably bridge work, structural activity is confined to relatively small projects. The overall tone is brisk, however, and fabricators continue to build up backlogs.

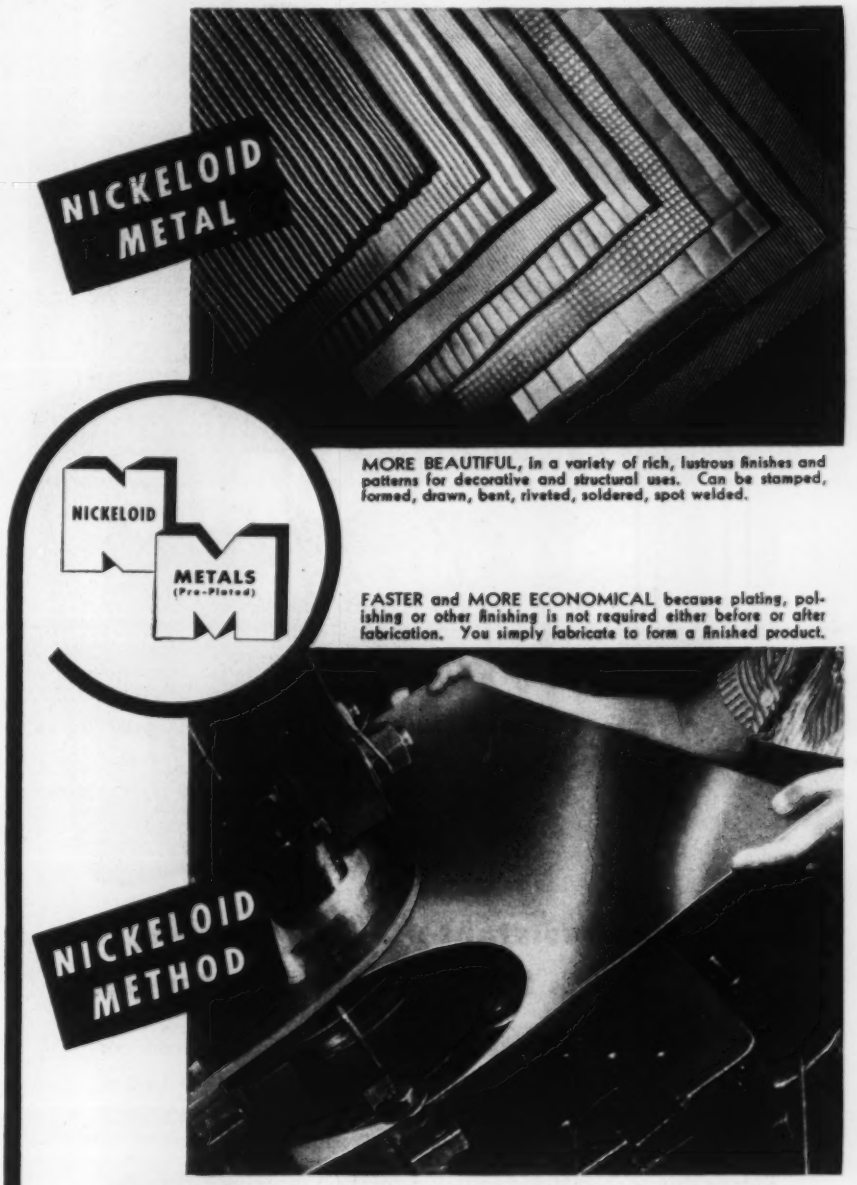
Philadelphia—One large producer is allocating tonnage and is virtually out of the market for current quarter. Another can make deliveries in six to nine weeks. Still another offers six to seven weeks on standard sections. Fabricators are building up backlogs. New Jersey turnpike work dominates interest.

Cleveland—Substantial number of small building projects, and considerable alteration work are keeping structural fabricators busy. However, price shading is severe and is restraining some fabricators from active bidding on many projects. Fabricators are encouraged to expect a firmer price situation as the building season progresses. Much public work is expected to strengthen the market over coming months. Importation of building steel from Europe at prices under domestic levels is seen as a threat to stability.

Birmingham—Fairly good volume in structural steel is maintained by highway and bridge work plus well scattered volume of smaller projects. A marked competitive situation is evident in most shop fabrication orders.

Los Angeles—Activity in small industrial building is quickening demand for 5 in., 8 in., and 10 in. I-beams, and smaller angles. Large projects are fewer, but a $4.8 million building program at the Norwalk State Hospital will get under way in July. Bids are being received for a $2.3 million penal reception center at Chino, Calif.

San Francisco—Prospects for reviving volume are brightening. Plans



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are announced for a 16-story apartment house in San Francisco.

Seattle — Fabricators have three months backlog. Estimators are busy with a mass of small projects.

Semifinished Steel . . .

Semifinished Prices, Page 121

Pittsburgh—Wire rods and forging billets are in tight supply. Operations of nonintegrated wire producers are retarded because of shortage of wire rods. Ingot conversion tonnage is growing steadily. Heavy demand for sheet bars is reflected in purchases by hand mill operators within a range of $70 to $75 per ton.

Wire . . .

Wire Prices, Page 123

Pittsburgh — Production schedules are filled into July for heavy and light gages of manufacturer's wire items. Automotive demand for valve and mechanical spring wire shows no sign of easing. Some decline is noted from the furniture trade. Improvement in fastener trade specifications is developing.

Birmingham—While all grades of wire are in consistently good demand, biggest complaint is heard on shortage of woven fencing.

Steel Bars . . .

Bar Prices, Page 121

Cleveland—Merchant bar buyers report increasing difficulty in getting in all the supplies they require. Forgers have experienced a substantial pickup in business lately and their steel requirements have expanded correspondingly. In some cases they had not restored inventories depleted as result of the steel and coal strikes. Consequently, some shops are pinched more than others. Fastener makers are specifying actively and would take more tonnage if they could get it. Producers are booked into third quarter on most sizes and anticipate pressure for deliveries through the summer, barring prolonged automotive labor trouble.

New York—Stringency in small hot carbon bar supplies is fairly general, with certain mills sold into mid-summer. On some of the larger specifications, such as rounds 7/16 in. and larger, producers can enter tonnage for this quarter. Shipments on cold-finished carbon bars depend greatly upon hot stock inventories at cold finishing plants.

Boston—Strong demand for free-machining high sulphur grades features bar buying.

Philadelphia—Hot carbon bar demand is expanding, and is increasingly diversified. Most sellers have not too much to offer over the remainder of this quarter. Some are booked into August on the small sizes.

Pittsburgh — Alloy bar producers are following an informal quota distribution policy on shipments to major consumers. Order backlogs extend four to six weeks on open-

hearth alloys while electric furnace grades are further extended. There is some evidence Chrysler parts suppliers have accumulated maximum inventories and are deferring mill commitments.

Los Angeles—Cold-rolled bar producers are finding no trouble keeping deliveries current with demand. March sales gained over those for February.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 121

Philadelphia — The New Jersey turnpike program is taking heavy tonnage. By May 4 bids will have been closed on various sections requiring 50,000 tons. By mid-summer, or early August, it is estimated bids will have been closed on work involving 100,000 tons.

Chicago—Fabricators' interest centers around the Veterans Administration research hospital, bids for which closed last week. Bar requirements are 2100 tons. Another important project is the new Nash plant at Kenosha, Wis.

Los Angeles—Requirements for reinforcing bars are increasing. One fabricator's orders for first half of April exceed those for all of March. Engineering awards for southern California, southern Nevada, and Arizona, totaled $19.8 million in March, highest for that month in 19 years.

Seattle — Rolling mill operations are steady. Inquiry for reinforcing bars, especially small tonnages, is active. Demand for merchant bars is slightly improved.

Plates . . .

Plate Prices, Page 121

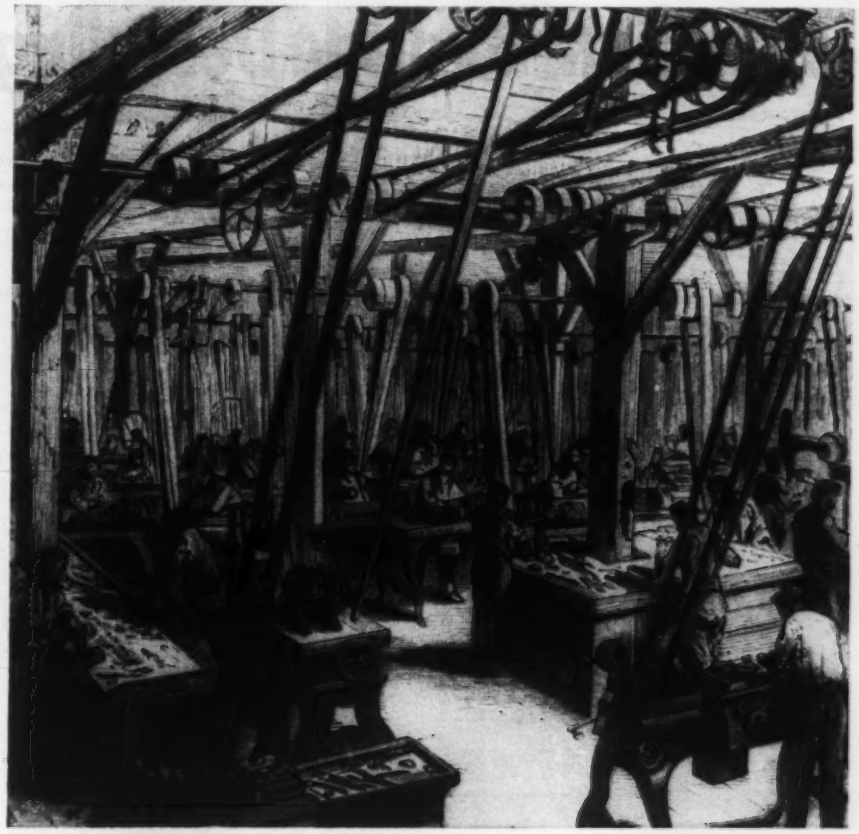
Chicago—With exception of floor plates plate specifications are sufficient to preclude order acceptance from some mills before August and September. With bulk going to pipe makers, other important users especially car shops, are hard put to meet production requirements with material from nearby mills. An inadequate supply is predicted through third quarter; unless unforeseen slackening occurs.

New York—Plate mill order backlogs are expanding steadily in the East. In addition to miscellaneous tank work, there are increasing demands from railroad, agricultural, and road building equipment manufacturers. Oil refinery and ship building needs lag.

Boston—Plate fabricating shop operations vary, some near capacity and others down to 50-60 per cent. Small tank volume is up. Competition tends toward uneven distribution of orders. Additional large pipeline tonnage is due shortly.

Philadelphia—Plate order backlogs are expanding. Some orders in the light gages for delivery this quarter are being turned down. Heavy gages are available in five weeks.

Birmingham—Strict allocation of plates has been instituted by local producers. Thus far, carbuilding has not struck full stride, but plate stocks



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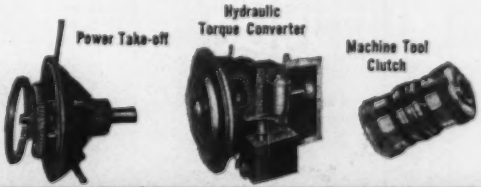

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are gradually being built up against large scale needs.

Seattle — Plate fabricators have fair backlogs. Outlook is improved after a slow first quarter. Demand for tanks and pipe, which is increasing, is augmented by reopening of Alaskan mining season and heavy construction in the north.

Tubular Goods . . .

Tubular Goods Prices, Page 124

Chicago—Pipe distributors fear their position between contractors and mills is in jeopardy. They believe greater use of trucks for pipe haulage makes by-passing of them easier. They reason that pipe shipment by trucks marks the first step in lower minimum tonnages for direct orders. Orders of less than 40,000 pounds will not presently be accepted by mills, but shipment of such tonnage by two or more trucks may be diverted to more than one user, the wholesalers fear.

Boston—Some price shading and tie-in sales crop out in merchant steel pipe among distributors. Full May allocations, in some cases, are not being taken by distributors. Utilities show more interest. New Bedford, Mass. Gas Co. is inquiring for 600 tons, 16-in., seamless. Two piers, Boston, require 12,235 tons of pipe piling, 6535 tons alternate sheet piling. Popular sizes in mechanical tubing are available in five to seven weeks.

Pittsburgh—Cold-drawn mechanical tubing deliveries extend six to eight weeks and hot-rolled tubing three to six weeks. Boiler tubing demand is depressed. Jobbers' stocks of standard pipe are in better balance. Some producers' order backlogs on transmission line pipe extend into 1954.

Seattle—Cast iron pipe market is quiet, large municipal requirements having been covered by previous purchases. Shipments of steel pipe are increasing.

Iron Ore . . .

Iron Ore Prices, Page 125

Cleveland—Late start of ore shipping on the Great Lakes because of bad ice conditions is causing shippers to revise downward their estimates of the probable 1950 ore movement.

It had been planned to bring down 75 to 80 million tons during the season. But with relatively little shipment likely before May 1 shippers are beginning to wonder if they will be able to move 70 million tons. By May 1 last year over 9 million tons had been shipped.

Heavy consumption of ore is cutting sharply into lower lake dock and furnace stocks. March consumption totaled 5,710,624 tons and it is expected April consumption will top that figure. Stocks at lower lake docks and furnaces amounted to 20,242,112 tons on Apr. 1, By May 1 these will be down around 13 million tons, less than two months' supply. Meanwhile, depleted stocks of certain grades are pinching furnace operators.

Pig Iron . . .

Pig Iron Prices, Page 120

New York—Pig iron specifications are heavier, reflecting modest improvement in foundry operations. April is expected to be the best month so far this year. Sellers are able to build up stocks in a better diversity of grades.

Boston — Slight improvement in foundry operations continues. Lower prices for castings results in some farming out of orders by captive foundries.

Philadelphia—Pig iron specifications are heavier than in March. District foundries are stepping up releases. Basic requirements are heaviest in months. One district merchant furnace is shifting from foundry to basic iron.

Buffalo—Improvement in merchant iron demand is sustained. A number of large melters are taking substantial tonnages. Operations are 100 per cent of capacity and a leading merchant iron seller reports no iron is being piled.

Cleveland—Foundries are specifying actively on pig iron contracts reflecting a noticeable pickup in demand for castings. Some foundries have gone on a longer work-week. Shops on motor castings are busy and those doing machine tool and heavy equipment work are more active. Pig iron production in the immediate district is down as result of the blowing out last week of one local blast furnace by Republic Steel Corp. for relining. The stack, which was on basic iron, will be out over a month. Eight stacks in the area are producing.

Cincinnati—Merchant pig iron specifications are disappointing. Melt for sanitary enamelware is heavy, but seasonal run on heating equipment is affected by a shift from use of coal.

Birmingham—Pig iron requirements are increasing due to improvement in pipe plant operations and general foundry activity. Capacity melt by merchant furnaces is expected to continue indefinitely.

St. Louis—Pressure on foundries for fast delivery of castings has hiked demand from that source to highest point in months. Customers are calling for more iron than at any time during the war. Furnaces in this district strove through the winter to build ground inventories, but were generally unsuccessful.

Seattle — Foundry operations are picking up, being about 60 per cent of capacity. Cupola cast ranges from $25 to $30. Foreign pig iron, selling about $7 under domestic, is being purchased in larger tonnages by local plants.

Rails, Cars . . .

Track Material Prices, Page 123

Chicago—Several independent car builders are expected to share in Pennsylvania Railroad's new car program. The road is inquiring for 5000 box cars and 5000 gondolas. Steel requirements will approximate

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180,000 tons. Mills report builders' demands, apart from this inquiry, would seriously overload order books if they attempted to meet them fully.

Philadelphia—An important eastern railroad is considering the addition of a large number of freight cars, possibly 10,000, under the Equitable leasing program.

Seattle—Firm bids for furnishing 45,700 tons' 115-lb rails and about 10,000 tons of accessories have been extended two weeks while government agencies work out transportation details for delivery in Alaska for the Alaska Railroad.

Scrap . . .

Scrap Prices, Page 128

Pittsburgh — Scrap market is stronger, as reflected in payment by brokers up to $33.50 for good industrial open-hearth grades and their apparent unwillingness to accept new commitments for less than $34. Last purchase of dealer No. 1 heavy melting scrap of $35 (up 50 cents a ton) thus appears to be out of line with current price levels. One mill has paid $35 for No. 1 bundles shipped from the Detroit area, indicating the effect on local market of rising prices in remote scrap-generating centers.

Market activity is restricted largely to buying by brokers to cover old orders or in anticipation of still higher price levels. Effort to increase hot-metal-to-scrap ratio in order to diminish dependence on scrap in the face of anticipated record output over the next few months has forced an advance ranging up to $2 in the turnings market. Crushers are paying a top price of $24.50 and at least one mill has purchased short shoveling turnings at $28 for May delivery. Resumption of buying on the part of some foundry interests has caused an upturn in quotations for cast grades. Slight advances also are noted for scrap rails.

New York—Scrap brokers' buying prices have been advanced on most grades, under active consumer demand. No. 1 heavy melting steel and No. 1 bundles are now $23.00-$24.00, f.o.b. shipping point.

Philadelphia — Prices on open-hearth grades are unchanged. Most consumers have covered current needs. Meanwhile, the leading eastern consumer has placed foreign orders for several cargoes of No. 1 heavy melting steel, mostly for shipment from western Europe.

Buffalo—Dealers covering recent scrap orders report movement from collection sources is not expanding as anticipated. Additional strength is noted in cast grades with cupola cast sold within a range of $33-$34, up 50 cents to $1.

Cleveland—Scrap prices are $1 a ton higher on most grades in this district. Undertone of the market is strong and trade authorities look for still higher levels soon. Mills have been paying premiums for high-quality offerings and are now showing more interest in accepting less desirable lots to support current high rate of operations. Brokers are actively covering on old orders.

Detroit—Under the impetus of electric furnace plants going full tilt on conversion ingots, the scrap market is strong. Choice steelmaking grades are up another $1.50 per ton. Local mill buying is quiet but steady. Shortage of good cast scrap has forced prices of No. 1 cupola and particularly clean auto cast to new high ground despite slow foundry buying.

Cincinnati — Quotations on most grades of scrap are higher, partly reflecting better bids on railroad lists. District melters have adequate stocks and are not anxious to buy, but brokers and dealers raised prices to levels competitive with nearby districts.

Chicago—Prices are up $1 on scrap of industrial origin, purchase of No. 1 heavy melting having been made at $30. Blast furnace grades are also up $1, short shovel turnings bringing $22. Foundry grades are also stronger, No. 1 cupola cast bringing $42-$43. No. 1 railroad material is quotable at $32-33. Other railroad items generally are holding to previously established prices. Scarcity of scrap for sale leads to some doubt among traders that the new prices will remain long in effect.

Birmingham — Considerable broker buying above posted prices is noted, especially heavy melting and several

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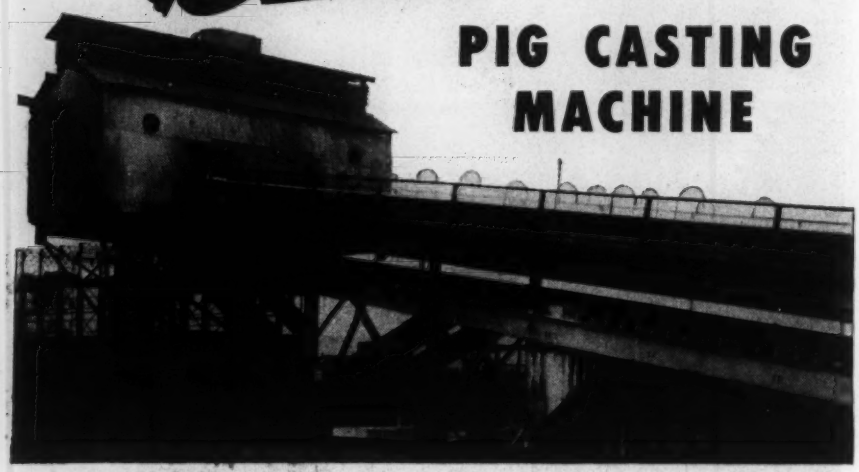

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grades of cast. Not a great deal of tonnage is moving to mills. An upturn in prices may develop before May 1.

St. Louis—Heightening demand and fewer offerings gave a $1 to $2 fillip to railroad cast prices. The rail market has been gaining strength several weeks and is in an oversold condition. Cast demand is picking up, aided by the fact pig deliveries are harder to get. Foundries are accelerating operations. Few orders for heavy melting steel are being placed, but brokers show signs of marking up prices in anticipation of heavier demand.

San Francisco — Scrap is unchanged. Demand shows no signs of a substantial pickup.

Seattle—No change is reported in scrap, mills covering current needs. Buyers are insisting on prepared scrap and are showing more discrimination in grading. Bids are being received for sale of 17,000 tons of rails from the Alaska Railroad.

Warehouse . . .

Warehouse Prices, Page 125

Pittsburgh — Fort Duquesne Steel Co. has established a representative stock here of cold-finished steel bars in the popular grades and sizes. The bars are from the large and diversified stock of the company's Cleveland affiliate.

Extended mill deliveries and revival of quota distribution have had little effect on warehouse steel order volume. Distributor's stocks are unbalanced with demand exceeding supply of sheets, strip and wide-flange beams.

The latest increase in slab zinc prices has raised mill coating extras on galvanized sheets with result distributors have advanced prices $1 to $4 a ton in the lighter gage ranges.

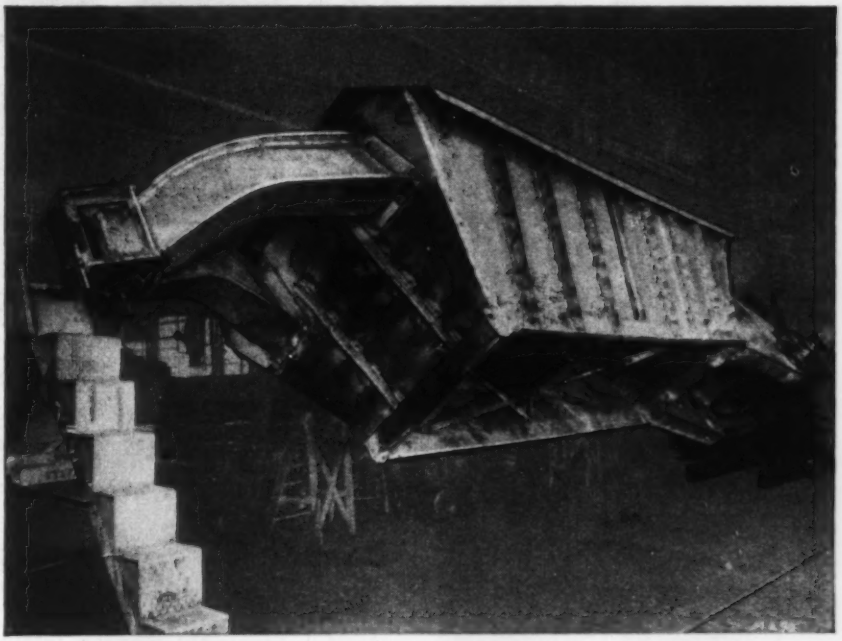
Philadelphia — Distributors are booking slightly more tonnage than in March. Potential business is restricted by inability to obtain sufficient sheets.

Cleveland—Distributors are entertaining satisfactory business, but they could book additional tonnage had they sufficient stocks of flat-rolled items to meet demands fully. April volume is expected to better that of March, which was excellent. In general, warehouse stocks are comfortably balanced except for the flat-rolled items. Bars are in somewhat tighter supply. Prices are firm, but unchanged. Advance on galvanized sheets effected by distributors at a few points as result of the recent increase in zinc prices has not extended to this area.

Cincinnati—Warehouse volume this month will hold about the same as that in March, due to lack of sheets to meet inquiries.

Chicago—Steel is arriving at warehouses more closely on schedule, but bulk of tonnage never gets into stock, being used to fill orders held until complete shipments can be made. Sheets and pipe remain critical.

Birmingham — Warehouse demand is well sustained and fairly active.



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Weldments Feature

★ *Strength*

★ *Uniformity*

★ *Economy*

Yes, Van Dorn Weldments are widely known for their outstanding quality—for they are backed by Van Dorn's complete fabricating facilities . . . experienced design engineers . . . specially trained workmen . . . 77 years' experience in metal working.

Consult us about your requirements—no obligation, of course. The Van Dorn Iron Works Co., 2685 East 79th Street, Cleveland 4, Ohio.

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FREE WELDMENT BOOK

● *Profusely illustrated; describes the many advantages of weldments, and Van Dorn's extensive facilities.*

Profit by our SKILL and FACILITIES

for your steel plate and pressure vessel fabrication. FITZGIBBONS is ready to produce carbon steel weldments of all kinds with special emphasis on code vessels to paragraph U-69. All fabrication at our plant in Oswego, N. Y. is of a quality to pass resident Hartford steel boiler inspection. Fabricating steel products has been our business since 1886. Contact us for quotations.

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Write for descriptive folder illustrating facilities available to build your product.

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Send me your bulletin S-1 on steel fabricating facilities.

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ADDRESS .....

CITY ..... STATE .....

Galvanized sheets are scarce, but relatively good stocks are held in most other specifications.

Los Angeles—Continuing scramble of fabricators for supplies is being compared by warehousemen to the immediate postwar period. Confidence of distributors in a sustained level of high activity is growing.

San Francisco — Steel warehouse sales are rising. Heaviest pressure is for sheets.

Seattle—Warehouse volume is rising following a disappointing first quarter. Cold-rolled sheets are extremely tight and no immediate relief is in prospect. Hot-rolled sheets in lighter gages also are scarce; stainless items also are in short supply. Price of hot-rolled has been adjusted from 6.70c to 6.60c and hot-rolled strip from 6.90c to 6.85c.

Canada . . .

Toronto, Ont.—Production of primary iron and steel shapes in Canada for January this year totaled 320,129 net tons against 305,636 tons in December and 321,337 tons in January, 1949. For January this year output included 310,925 tons of carbon steel shapes and 9204 tons of alloy steel shapes. Production figures for the month under review include 92,064 tons of shapes shipped under producers interchange to producers' own plants or plants within the primary industry for further processing.

Primary iron and steel shapes shipped for sale in January amounted to 211,431 net tons of which 203,045 tons were carbon and 8386 tons alloy steel shapes; for December last shipments for sale amounted to 234,284 tons including 225,580 tons of carbon and 8704 tons of alloy steel shapes, and for January, 1949 shipments amounted to 233,548 tons including 224,910 tons of alloy and 8638 tons of carbon steel shapes. The above figures showing iron and steel shapes for sale do not include the tonnage under producers' interchange.

Shipments for January included 6003 tons of semifinished shapes; 11,180 tons of structurals; 12,606 tons of plates; 31,167 tons of rails; 6072 tons of tie plates and track materials; 34,648 tons of hot-rolled bars; 12,832 tons of pipes and tubes; 24,839 tons of wire rods; 28,764 tons of black sheets; 6890 tons of galvanized sheets; 5832 tons of castings and 7207 tons of other rolled products.

Of the amounts shipped for sale in January, 36,722 tons went direct to railways and railway car shops; 19,576 tons to pressing, forming and stamping plants; 25,944 tons to merchant trade products; 23,626 tons to building construction; 14,785 tons to the containers industry; 11,514 tons to agricultural equipment; 13,324 tons to the automotive industry; 10,183 tons to machinery plants; 2905 tons to shipbuilding; 7003 tons to mining, lumbering, etc., and 1250 tons to miscellaneous industries; wholesalers and warehousing accounted for 23,646 tons and exports for 17,394 tons.

The biggest THIEF in America!

ALL through the summer—through hot, humid days and hot, humid nights—the biggest thief in America will be raiding your plant, stealing your profits, stealing your steel.

In every department—where raw steel comes in, where it is stamped or milled or machined or ground, where it is pickled or cleaned or assembled—the moisture in the air is always helping that big thief, RUST, to rob you of production.

But you don't have to put up with this moist-month thievery. The Oakite Technical Service Representative can help you defeat RUST. He is well equipped with methods and material for:

1. Removing rust from raw stock
2. Preventing rust while parts are being processed
3. Cleaning and de-rusting in one operation
4. Cleaning with simultaneous conditioning for painting *plus* protection against rust before and after the steel is painted.

FREE For help in arresting RUST in your plant, write to Oakite Products, Inc., 34E Thames St., New York 6, N. Y.

Machine cleaning	Tank cleaning
Electrocleaning	Pickling
Pre-paint treatment	Burnishing
Steam-gun cleaning	Paint stripping

SPECIALIZED INDUSTRIAL CLEANING
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MATERIALS • METHODS • SERVICE
Technical Service Representatives Located in Principal Cities of United States and Canada

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

4700 tons, state highway bridge, Belle Vernon, Pa., to Fort Pitt Bridge Works, Pittsburgh.

2500 tons, Du Pont plant addition, Camden, S. C., to Virginia Bridge Co., Roanoke, Va.

2200 tons, plant expansions, Solvan Division, Allied Chemical & Dye Corp., Syracuse, N. Y., to Lehigh Structural Steel Co., Allentown, Pa.

1650 tons, barge and warehouse, Valentine Brewery Co., Newark, N. J., area to Bethlehem Steel Co.

1400 tons, Washington state Snake river bridge, to Poole, McGonigle & Dick, Portland, Oreg.; General Construction Co., Seattle, general contractor.

1350 tons, textile mill, Wilmington, N. C., to Virginia Bridge Co., Roanoke, Va.

440 tons, Levey Bros. apartment, E. 89th St., New York, to Harris Structural Steel Co., that city.

300 tons, miscellaneous construction projects, to Leckenby Structural Steel Co., Seattle.

175 tons, field house, International Business Machines Corp., Poughkeepsie, N. Y., to Anthracite Bridge Co., Scranton, Pa.

150 tons, textile mill, Burnsville, N. C., to Dave Steel Co., Asheville, N. C.

150 tons, Van Asselt school, Seattle, to Leckenby Structural Steel Co., Seattle.

140 tons, 85 x 440 foot warehouse for Northwest Steel Rolling Mills Inc., Seattle, to Leckenby Structural Steel Co., Seattle.

STRUCTURAL STEEL PENDING

20,000 tons, bridge at the east end of Jones Beach, Long Island; plans to be out July 1.

3000 tons, viaducts and underpasses, contract No. 2, Olneyville cutoff, Providence, R. I. 2470 ft of pipe drains are required.

2325 tons, contract No. 23, New Jersey State Turnpike Authority bridge work, Middlesex county, bids May 9; in addition, 5500 ft of steel railing, 13,380 ft of pipe conduit.

2050 tons, Raritan river bridge, contract 30, New Jersey Turnpike Authority; Harris Structural Steel Co., New York, low bidder.

2500 tons, Atlantic Beach bridge, New York; Frederick Snare, low on general contract.

1300 tons, state bridges, Taunton-Berkley-Fall River, Mass.

750 tons, apartment, Wilmington, Del.; bids May 1.

650 tons, Public School No. 184 Queens, New York, Psaty & Furhman, that city, low on general contract.

425 tons, substations in Washington and Oregon; bids to Bonneville Power Administration, Portland, Oreg., Apr. 21.

304 tons, state bridge work, Bucks county, Pennsylvania; bids May 12.

250 tons, construction project at Hanford; Bethlehem Pacific Coast Steel Corp., Seattle, low.

250 tons, 125-ton gantry crane for Hungry Horse dam; bids to Bureau of Reclamation, Denver, Apr. 27.

220 tons, state bridge, Salem, Mas.

150 tons, four gate hoists for Hungry Horse dam; bids to Bureau of Reclamation, Denver, Apr. 28.

Unstated, extension to East switchyard, Coulee dam; general contract to Morrison, Knudsen Co. and Peter Kiewit Sons Co., joint low bid $97,864.

Unstated, military installation at Naknek, Alaska; Gaasland Co. Inc., Bellingham, Wash., low base $1,766,677.

REINFORCING BARS . . .

REINFORCING BARS PLACED

1500 tons, 4950 Marine Dr. apartment, Chicago, through Peter Hamlin Construction Co. to Olney J. Dean Steel Co., Chicago.

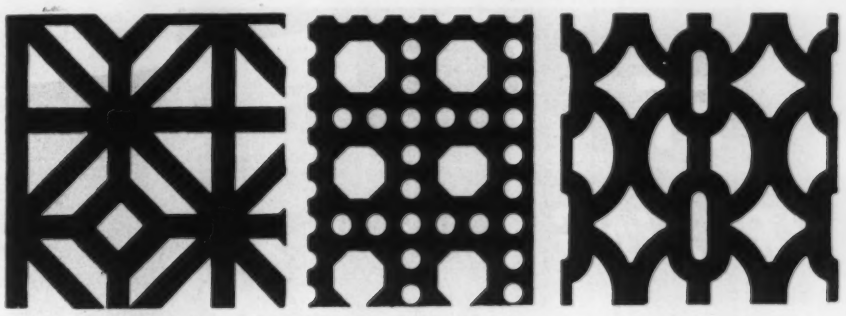
1000 tons, factory for Rambler production, Kenosha, Wis., Nash - Kelvinator Corp., through Austin Co., Cleveland, to Bethlehem Steel Co.

122 tons, recreation building, Oak Forest, Ill., to Olney J. Dean Steel Co., Chicago.

105 tons, Church of the Epiphany, Chicago, to Olney J. Dean Steel Co., that city.

REINFORCING BARS PENDING

2100 tons, Veterans Administration research



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There is no comparison between our first crane and the sleek, rugged, safe and dependable model we produce today. The very fact, however, that we have been in business for nearly half a century suggests that industry has made a habit of specifying BEDFORD CRANES. With capacities from 5 to 150 tons, any span or lift, they are designed and engineered to meet specific requirements. OVERHEAD TRAVELING CRANES • GANTRY CRANES • STEEL DERRICKS • STRUCTURAL STEEL • STEEL BUILDINGS • GRAY IRON CASTINGS.

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Engineers • Designers • Fabricators

hospital, Chicago; bids taken Apr. 18.

630 tons, contract No. 23, New Jersey State Turnpike Authority bridge work, Middlesex county; bids May 9.

510 tons, St. Luke's Hospital, Cedar Rapids, Iowa; R. W. Renderknecht, that city, low on general contract.

450 tons, animal science building, University of Illinois, Urbana, Ill.; Somner S. Sollitt & Co., Chicago, low on general contract.

180 tons, reinforcing bars, state bridge work, Bucks county, Pennsylvania; bids May 12.

150 tons, state bridge work, Westmoreland county, Pennsylvania, bids May 12.

PLATES . . .

PLATES PENDING

4530 tons sheet and 170 tons T piling for Chief Joseph dam; identical bids, $428,660, Columbia Steel Co., f.o.b. South Chicago, and Bethlehem Steel Co., f.o.b. Lackawanna, N. Y., to U. S. Engineer, Seattle.

119 tons, three penstocks and wheel gates and frames, Canyon Ferry dam, Idaho; bids to Bureau of Reclamation, Denver, Apr. 28.

Unstated, 150,000-gal. steel storage tank, for Coulee dam; bids to Bureau of Reclamation, Denver, Apr. 27.

PIPE . . .

STEEL PIPE PLACED

Unstated, 9300 feet 14 inch water pipe for Hazelwood water district, Portland, Oreg., to Water Works Supply Co., Portland.

Unstated, 91,300 feet various sizes, for Kennewick, Wash., to Water Works Supply Co. and Armco Drain & Metal Products, Portland, Oreg., low joint bids $105,607.

STEEL PIPE PENDING

600 tons, 16 in. steel pipe, New Bedford (Mass.) Gas Co.

5700 tons, 14 in., piling, pier No. 1, Commonwealth Pier, Boston.

CAST IRON PIPE PENDING

300 tons, also accessories, 6 and 8 inch cast iron pipe for Coulee dam; bids to Bureau of Reclamation, Denver, Apr. 27; spec. No. R-I-CB-51.

RAILS, CARS . . .

RAILROAD CARS PLACED

Lake Superior & Ishpeming, fifty 55-ton box cars, to Pullman-Standard Car Mfg. Co., Chicago.

Mather Stock Car Co., 130 refrigerator cars, to its own shops.

FERROALLOYS

(*Continued from Page 125*)

Foundry Ferrochrome: (Cr 62-66%, C 5-7%). Contract, c.l., SMxD, bulk, 22.0c per lb of contained Cr, c.l., packed 22.9c, ton 24.25c, less ton 26.0c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome: (Cr 67-72%). Contract, carload, lump, bulk, max. 0.03% C 31.85c per lb of contained Cr, 0.04% C 29.75c, 0.06% C 28.75c, 0.10% C 28.25c-28.5c, 0.15% C 28.0c, 0.20% C 27.75c, 0.50% C 27.5c, 1% C 27.25c, 1.50% C 27.1c, 2% C 27.0c. Carload packed add 1.1c, ton lot add 2.2c, less ton add 3.9c. Delivered. Spot, add 0.25c.

"SM" Low-Carbon Ferrochrome: (Cr 62-66%, Si 4-6%, Mn 4-6%, C 0.75-1.25% max.). Contract, carload, lump, bulk 27.75c per lb of contained chromium, carload, packed 28.85c, ton lots 30.05c, less ton 31.85c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome, Nitrogen Bearing: Add 5c to 0.10% C low-carbon ferrochrome prices for approx. 0.75% N. Add 5c for each 0.25% of N above 0.75%.

Low-Carbon Ferrochrome Silicon: (Cr 34-41%, Si 42-49%, C 0.05% max.) Contract, carload, lump, 4" x down and 2" x down, bulk, 20.50c per lb of contained chromium plus 11.30c per pound of contained silicon; 1" x down, bulk, 20.65c per pound of contained chromium plus 11.50c per pound of contained silicon. F.o.b. plant; freight allowed to destination.

Chromium Metal: (Min. 97% Cr and 1% Fe). Contract, carload, 1" x D; packed, max 0.50%

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THERMOCOUPLE INSULATORS

This Gordon Thermocouple Insulator, heated red hot and plunged into cold water, came out just as good as new

Available only through GORDON, Serv-rite Thermocouple Insulators are made to stand the gaff of excessive thermal shock far above normal requirements.

For sturdy and reliable thermocouple insulator performance to meet peak production needs — Specify Serv-rite...a Gordon development backed by 36 years' experience in supplying industry with insulators that last longer and give better results.

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C grade, $1.03 per lb of contained chromium. ton lot $1.05, less ton $1.07. Delivered. Spot, add 5c.

Silicon Alloys

25-30% Ferrosilicon: Contract, carload, lump, bulk, 17.00c per lb of contained Si; packed 18.40c; ton lot 19.50c, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

50% Ferrosilicon: Contract, carload, lump, bulk, 11.3c per lb of contained Si, carload packed 12.9c, ton lot 14.35c, less ton 16c. Delivered. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max.) Add 1.3c to 50% ferrosilicon prices.

75% Ferrosilicon: Contract, carload, lump, bulk, 13.5c per lb of contained Si, carload packed 14.8c, ton lot 15.95c, less ton 17.2c. Delivered. Spot, add 0.8c.

80-90% Ferrosilicon: Contract, carload, lump, bulk, 14.65-15.0c per lb of contained Si, carload packed 15.9c, ton lot 16.9c, less ton 18.05c. Delivered. Spot, add 0.25c.

Low-Aluminum 85% Ferrosilicon: (Al 0.50% max.). Add 0.7c to 85% ferrosilicon prices.

90-95% Ferrosilicon: Contract, carload, lump, bulk, 16.5c per lb of contained Si, carload packed 17.7c, ton lot 18.65c, less ton 19.7c. Delivered. Spot, add 0.25c.

Low-Aluminum 90-95% Ferrosilicon: (Al 0.50% max.). Add 0.7c to above 90-95% ferrosilicon prices.

Silicon Metal: (Min. 97% Si and 1% max. Fe). C.l., lump, bulk, regular 19.0c per lb of Si, c.l. packed 20.2c, ton lot 21.1c, less ton 22.1c. Add 1.5c for max. 0.10% calcium grade. Deduct 0.4c for max. 2% Fe grade analyzing min. 96% Si. Spot, add 0.25c.

Alsifer: (Approx. 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 7.65c per lb of alloy, ton lots packed 9.05c, 200 to 1999 lb 9.40c, smaller lots 9.90c. Delivered. Spot up 0.5c.

Briquetted Alloys

Chromium Briquets: (Weighing approx. 3¾ lb each and containing exactly 2 lb of Cr). Contract, carload, bulk, 13.75c per lb of briquet, carload packed 14.45c, ton lot 15.25c, less ton 16.15c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx. 3 lb and containing exactly 2 lb of Mn). Contract, carload, bulk 10.45c per lb of briquet, c.l. packaged 11.25c, ton lot 12.05c, less ton 12.45c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx. 3½ lb and containing exactly 2 lb of Mn and approx. ½ lb of Si). Contract, c.l. bulk 10.30c, per lb of briquet, c.l. packaged 11.1c, ton lot 11.9c, less ton 12.8c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx. 5 lb and containing exactly 2 lb of Si). Contract, carload, bulk 6.15c per lb of briquet, c.l. packed 6.95c, ton lot 7.75c, less ton 8.65c. Delivered. Spot, add 0.25c.
(Small size—weighing approx. 2¼ lb and containing exactly 1 lb of Si). Carload, bulk 6.30c, c.l. packed 7.10c, ton lots 7.90c, less ton 8.80c. Delivered. Add 0.25c for notching, small size ony. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2¼ lb of Mo each) 95.00c per pound of Mo contained. F.o.b. Langeloth, Pa.

Calcium Alloys

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%.) Contract, carload, lump, bulk 19.25c per lb of alloy, carload packed 20.05c, ton lot 21.55c, less ton 22.55c. Delivered. Spot, add 0.25c.

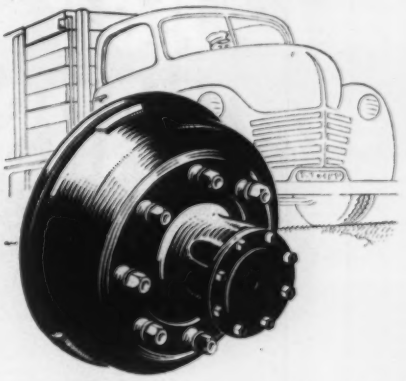
Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.50-3%). Contract, carload, lump, bulk 17.9c per lb of alloy, carload packed 19.1e, ton lot 21.0c, less ton 22.5c. Delivered. Spot add 0.25c.

Titanium Alloys

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max., Si 4% max., C 0.10% max.) Contract, ton lots 2" x D, $1.40 per lb of contained Ti; less ton $1.45. (Ti 38-43%, Al 8% max., Si 4% max., C 0.10% max.) Ton lot $1.28, less ton $1.35, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis. Spot, add 5c.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract $160 per net ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi river and north of Baltimore and St. Louis.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 3-4.5%.) Contract, $175 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.



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The addition of Molybdenum to cast iron has specially applicable effects where good resistance to wear must be combined with least susceptibility to cracking under sudden changes of temperature.

Brake drums, for instance: here is a well-proved composition, 3.70% Total Carbon, 1.80% Silicon, 0.80% Manganese, with 0.50% Chromium and 0.70% Molybdenum added.

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Vanadium Alloys

Ferrovanadium: Open-Hearth Grade (Va 35-55%, Si 8-12% max., C 3-3.5% max.) Contract, any quantity, $2.90 per lb of contained Va. Delivered. Spot, add 10c. **Crucible-Special Grades** (Va 35-55%, Si 2-3.5% max., C 0.5-1% max.), $3. **Primos and High Speed Grades** (Va 35-55%, Si 1.50% max., C 0.20% max.) $3.10.

Grainal: Vanadium Grainal No. 1, 93c; No. 6 63c; No. 79, 45c, freight allowed.

Vanadium Oxide: Contract, less carload lots $1.20 per lb contained V_2O_5, freight allowed. Spot, add 5c.

Tungsten Alloys

Ferrotungsten: (70-80%). Contract, 10,000 lb W or more, $2.25 per lb of contained W; 2000 lb W to 10,000 lb W, $2.35; less than 2000 lb W, $2.47. Spot, add 2c.

Tungsten Powder: (W 98.8% min.). Contract or spot, 1000 lb or more, $2.90 per lb of contained W; less than 1000 lb W, $3.

Zirconium Alloys

12-15% Zirconium Alloys: (Zr 12-15%, Si 39-43%, Fe 40-45%, C 0.20% max.). Contract, c.l., lump, bulk 6.6c per lb of alloy, c.l. packed 7.35c, ton lot 8.1c, less ton 8.95c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max.). Contract carload, lump, packed 20.25c per lb of alloy ton lot 21c, less ton 22.25c. Freight alowed. Spot, add 0.25c.

Boron Alloys

Ferroboron: (B 17.50% min., Si 1.50% max., Al 0.50% max., C 0.50% max.). Contract, 100 lb or more, 1" x D, $1.20 per lb of alloy. Less than 100 lb $1.30. Delivered. Spot, add 5c F.o.b. Washintgon, Pa., prices 100 lb and over are as follows: Grade A (10-14% B) 75c per pound; Grade B (14-18% B) $1.20; Grade C (19% min. B) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si), $4.25 per lb contained B, f.o.b. Philo, O., with freight not to exceed railroad freight allowed to destination.

Bortam: (B 1.5-1.9%). Ton lots, 45c per lb; smaller lots,. 50c per lb.

Carbortam: (B 1 to 2% contract, lump, carloads 9.50c per lb, f.o.b. Suspension Bridge, N. Y., frt allowed same as high-carbon ferrotitanium.

Other Ferroalloys

Ferrocolumbium: (Cb 50-60%, Si 8% max., C 0.4% max.). Contract, ton lot, 2" x D, $3.50 per lb of contained Cb, less ton $3.55. Delivered. Spot, add 10c.

Ferrotantalum—Columbium: (Cb 40% approx., Ta 20% approx., and Cb and Ta 60% min. C 0.30 max.) ton lots, 2" x D, $2.67 per lb of contained Cb plus Ta, delivered; less ton lots $2.72.

CMSZ Mixes: (No. 4—Cr 45-49%, Mn 4-6%, Si 18-21%, Zr 1.25-1.75%, C 3-4.5%; No. 5—Cr 50-56%, Mn 4-6%, Si 13.50-16.0%, Zr 0.75-1.25%, C 3.50-5%). 12 M x D, carload packed 19.0c per lb of material, ton lot 19.75c, less ton 21.0c. Delivered.

Silcaz Alloy: (Si 35-40%, Ca 9-11%, Al 6-8%, Zr 3-5%, Ti 9-11%, B 0.55-0.75%). Carload packed, 1" x D, 43c per lb of alloy, ton lot 45c, less ton 47c. Delivered.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx.). Contract, carload, packed, ¼" x 12 M, 16.5c per lb of alloy, ton lots 17.50c, less ton 18.5c. Delivered. Spot, add 0.25c.

Graphidox No. 4: (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l. packed, 17.00c per lb of alloy; ton lots 18.00c; less ton lots 19.50c, f.o.b. Niagara Falls, N. Y.; freight allowed to St. Louis.

V-S Foundry Alloy: Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed, 14.25c per lb of alloy; ton lots 15.75c; less ton lots 17.00c, f.o.b., Niagara Falls, N. Y.; freight allowed to St. Louis.

Simanal: (Approx. 20% each Si, Mn, Al). Lump, bulk, carload 11.00c. Ton lots, bulk 11.50c, packed 11.75c. Less ton lots, packed 12.25c per lb of alloy, f.o.b. Philo, O., with freight not to exceed railroad freight allowed to destination.

Ferrophosphorus: (23-25% based on 24% P content with unitage of $3 for each 1% of P above or below the base); carloads, f.o.b. seller's works, Mt. Pleasant, or Siglo, Tenn., $65 per gross ton.

Ferromolybdenum: (55-75%). Per lb, contained Mo, f.o.b. Langeloth and Washington, Pa., furnace, any quantity $1.13.

Technical Molybdic-Oxide: Per lb, contained Mo., f.o.b. Langeloth and Washington, Pa., packed in bags containing 20 lb of molybdenum, 95.00c.

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Metalworking Briefs

CONSTRUCTION, ENTERPRISE ORGANIZATIONAL CHANGES

Alabama

Organization of **Patterson-Emerson-Comstock of Alabama** is announced. The company, with offices in the Brown-Marx building, Birmingham, offers engineering and construction services to industry and public utilities. It is associated with **Patterson-Emerson-Comstock Inc.**, large industrial contracting firm.

California

El Segundo, Calif., assembly plant of **Nash Motors**, Kenosha, Wis., is undergoing a $250,000 expansion. New assembly lines are being installed.

California

Allied Metal Treating Inc., a new heat treating concern, is conducting operations at 359 Del Monte St., Pasadena 3, Calif., under the supervision of Russell Lowrey. A full complement of atmosphere furnaces and salt bath facilities has been installed.

California

Laurance S. Rockefeller and a group of investors acquired controlling stock interest in **Marquardt Aircraft Co.**, Los Angeles, from **General Tire & Rubber Co.** The group's purchase of the Marquardt stock and planned additional financing for the company will exceed $400,000.

Connecticut

Whiton Machine Co., New London, Conn.—lathe chucks, centering machines and gear cutting machines—appoints these dealers: **American Steel & Supply Co.**, Chicago 4; **Hibbard, Spencer, Bartlett Co.**, Evanston, Ill.; **Keiser-Van Leer Co.**, Bloomington, Ill.; **Clarke F. Sanford & Co.**, and **South Bend Supply Co.**, St. Louis; **Industrial Equipment & Supply Co.**, Benton Harbor, Mich.; **Miles Machinery Co.**, Saginaw, Mich.; **Howard & Smith Inc.** and **McKee-Kenyon & Co.**, Detroit; **Neill-LaVielle Supply Co.**, Louisville; **Steel City Tool & Supply Co.**, Pittsburgh.

Illinois

City of Carbondale, Ill., will receive bids until Apr. 27 on construction of sewage treatment plant additions and improvements. Russell & Axon, 408 Olive St., St. Louis 2, is the consulting engineer.

Illinois

Major Foundry Co. moved from 2001 B. Major St., Chicago, to a new plant at 9300 W. Belmont Ave., Franklin Park, Ill. Company's facilities for production of gray iron, semisteel and alloyed iron castings include a new 56-in. cupola of 10 tons per hour melting capacity with mechanical charging equipment, new molding machines and a 5-ton overhead crane. R. Hoffman is president.

Iowa

Town of Ogden, Iowa, will receive bids May 16 on a power plant building addition and equipment. Estimated cost is $113,000. Henningson Engineering Co., 626 Standard Oil Bldg., Omaha, Nebr., is the consulting engineer.

Michigan

George R. Horne & Co., 22187 W. Michigan Ave., Dearborn, Mich., is appointed representative by **Heinemann Electric Co.**, Trenton, N. J.

Missouri

American Furnace Co., St. Louis, awards the general contract for a warehouse and office building at 1300 Hampton Ave. to John Hill Construction Co., 915 Olive St. Russell Conzelman, 17 Hanley Downs, Richmond Heights, St. Louis 19, is the architect.

Missouri

Evens & Howard Sewer Pipe Co., 5200 Manchester Ave., awards a contract for a factory building to G. L. Tarlton Contracting Co., 5505 Dale Ave., St. Louis 10.

Missouri

W. W. Warren Coke Co., St. Louis, awards contract for warehouse and office building to the J. S. Alberici Construction Co., 1550 Irving Ave., St. Louis 20.

Missouri

District office has been opened in St. Louis by **Tinnerman Products Inc.**, Cleveland, producer of Speed Nut brand of fasteners. Carl F. Marcussen, formerly with the Tinnerman Chicago district office, is manager of the new district with offices at 7614 Wydown Blvd., St. Louis 17.

New York

Niagara Mohawk Power Corp., Syracuse, N. Y., will build a $27 million steam-electric generating plant on the Hudson river three miles south of Albany, N. Y. The company also is applying to the FPC for permission to build a hydroelectric plant on the Sacandaga river three miles above the point where it flows into the Hudson.

New York

Carrier Corp., Syracuse, N. Y.,—air conditioning units—will build a $2 million plant on the outskirts of that city. Another $1 million is set aside to equip the new factory.

New York

Blackstone Corp., Jamestown, N. Y., has a $1 million building expansion program. The addition will be completed this summer.

New York

Morrison Steel Products Inc., Buffalo, has broken ground for a $100,000 plant addition.

New York

Winsmith-Buffalo, Marine Trust Bldg., Buffalo 3, is appointed representative by **Winfield H. Smith Corp.**, Springville, N. Y., manufacturer of speed reducers and gears. Winsmith-Buffalo is a new company under the management and proprietorship of L. D. Aydelotte, former sales manager of Winfield Smith.

New York

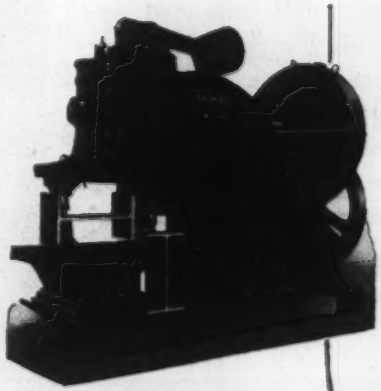
Construction has started on a pilot plant in Corning, N. Y., for **Corning Glass Works.** It is being built by **H. K. Ferguson Co.**, Cleveland.

New York

New York offices of **Raybestos-Manhattan Inc.** are now located at 500 Fifth Ave.; previous location was at 120 Broadway. These offices include the New York and New

BEAM PUNCHING

without tool change



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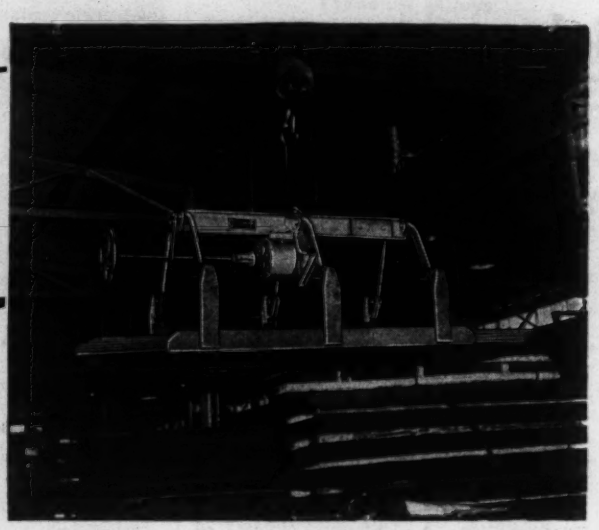

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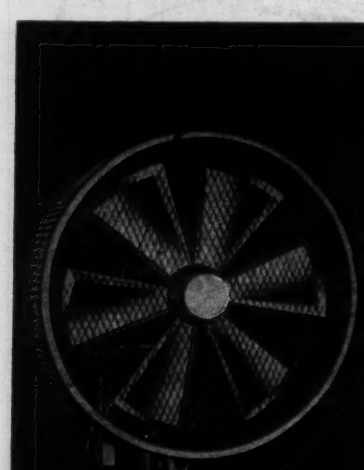

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England district office of the Manhattan Rubber Division and the Corporation Export Department, including Allied Asbestos & Rubber Co. (Export) Inc.

New Jersey

Riverside Metal Co., Riverside, N. J., appointed **Clifford Metal Sales Co.**, Providence, R. I., as a warehousing distributor of its copper and copper-base alloys. The company also established a new sales office at its headquarters in Riverside under the direction of Robert G. Clark.

Ohio

B. F. Goodrich Chemical Co., Cleveland, will begin construction in May of a $500,000 applied research laboratory at the company's property in Avon Lake, O.

Wide World

TIME SCALE: A German inventor says he has developed a new electric-acoustic apparatus to enable watchmakers to set the speed of watches in three minutes—normally a day-long job. How? A control watch and the customer's watch are fastened to microphones that carry the strokes to an operator's headphones so defects can be detected. As soon as the strokes of the watch coincide, the hand on the apparatus' scale starts to move. It stops when the strokes coincide a second time thus telling the watchmaker how fast or slow a customer's watch is. The machine costs $600

Ohio

A. O. Smith Corp., Milwaukee, purchased **Whirl-A-Way Motors Inc.**, Tipp City, O. Whirl-A-Way manufactures fractional motors from ½ to ¾ hp.

Ohio

Romos Enterprises, Cincinnati, bought controlling interest in the **Sidney Machine Tool Co.**, Sidney, O.

Ohio

Bids for an office and warehouse building are being received at the Akron real estate office of **Goodyear Tire & Rubber Co.**, Melbourne Ave.

Ohio

Nelson McCoy Pottery Co., Roseville,

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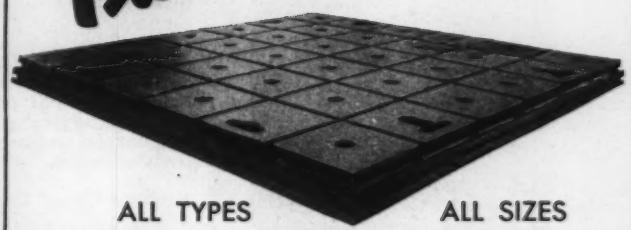

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